

Principles of Education.

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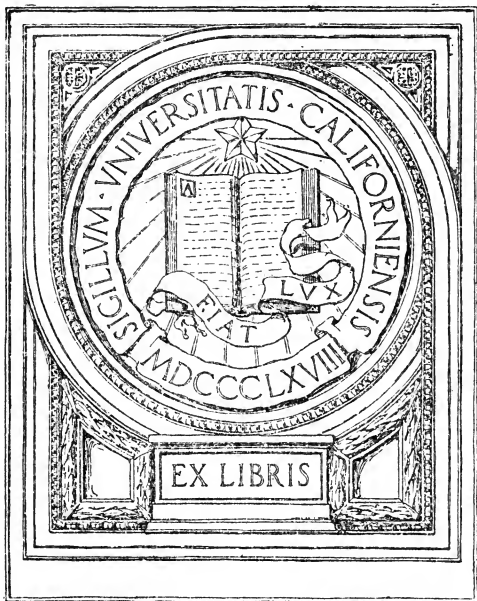
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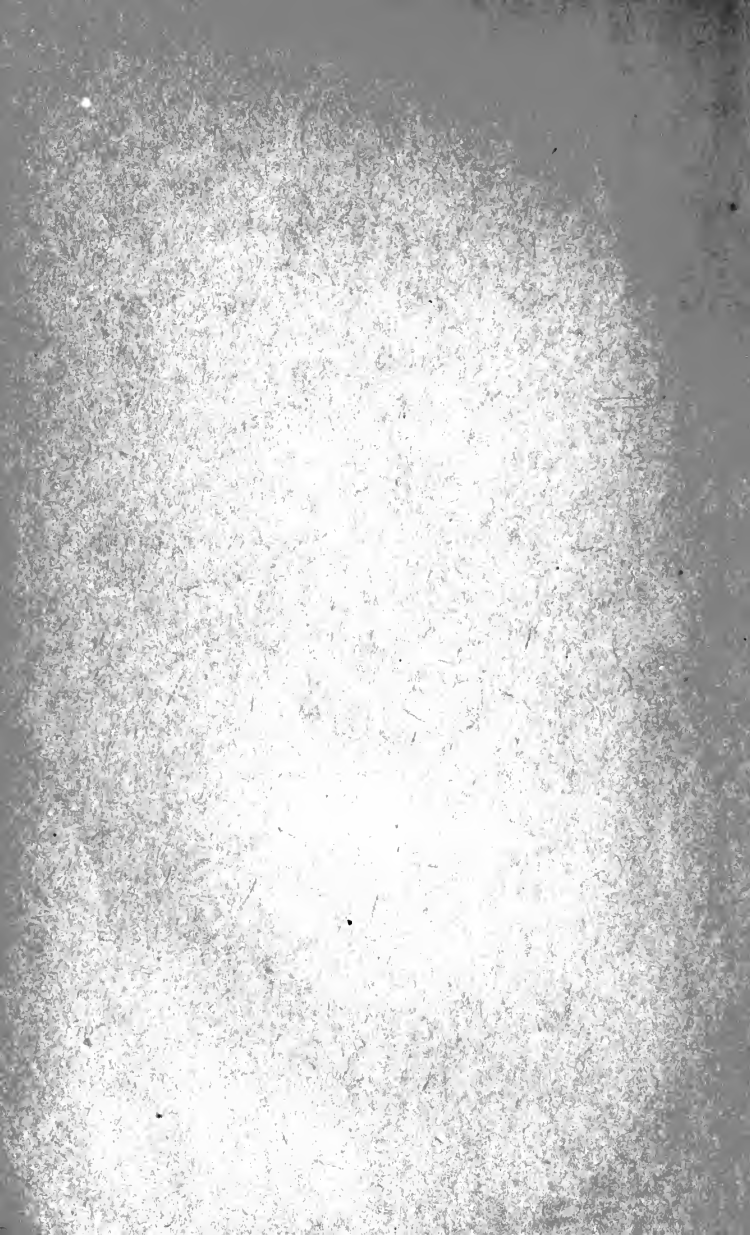


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PRINCIPLES OF EDUCATION

(*THEORITICAL AND APPLIED*)

BY

CHANDRA CHAKRABERTY

Author of *Dyspepsia and Diabetes, A Hindu System of Medicine, A Study into Hindu Social Polity, The Principles of Education, Food and Health, etc , etc.*

PUBLISHED BY
RAMCHANDRA CHAKRABERTY,
58, Cornwallis Street, Calcutta.
1922.

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PRINTED IN INDIA

no. VIII
1880.1.10

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WORKS BY THE SAME AUTHOR.

- (1) Food and Health 2s. net.
- (2) Principles of Education ... 1s. 4d. net.
- (3) A Hindu System of Medicine [In the press]
- (4) A Study into Hindu Social Polity 3s. 6d. net.
- (5) Dyspepsia and Diabetes (in the press).

These volumes may be had at 364 west, 120th Street, New York, U. S. A., 68 Russel Street, London, and 58 Cornwalli's Street, Calcutta.

PRINTED BY BISHNUPADA HAZRA
AT THE SANSKRIT PRESS.
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THIS BOOK IS

Respectfully Dedicated

To my Father

SRIJUKTA KALIKANTA CHAKRABERTY.

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to you
myself

My dear

My dear

My dear

My dear

PREFACE.

There is no better fortune for an individual or for a race than knowledge and its cultural asset and no worse misfortune than ignorance. Nor is there any investment more fruitfull in return than in education and educational institutions.

There may be difference of opinion as to the treatment of subjects in this book. But it has been written with an honest motive, and if it succeeds to provoke a creative interest, which has been my main object, the book will serve its purpose and my labour would not be in vain.

Dec. 31-1920

THE AUTHOR.

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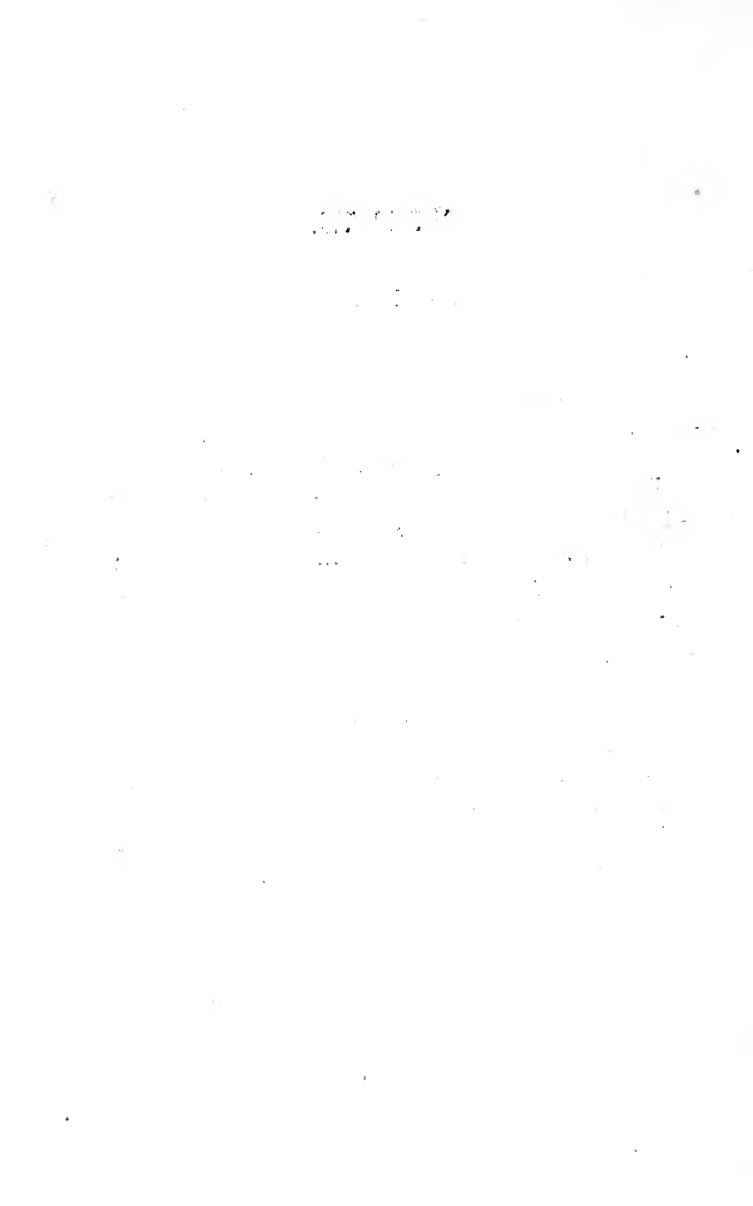
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Principles of Education.

I

What is Education ?

The theme of education has been the absorbing problem of all ages in all climes among all races ever since man has become a reflective creature and begun to ponder over the best way as to transmit the racial lore, culture and traditions. Scholars have written many learned dissertations on the subject, yet the educational theory often consists of a few high-sounding metaphysical platitudes, which are rather more mystifying than enlightening. The aims of education have been generally, (a) the acquisition of knowledge, (b) physical fitness, (c) moral consciousness and (d) religious training. But these have been attacked by the educators from their own points of view. They say: (1) what is the use of culture, if one can not earn his livelihood independently thereby? Let therefore each one learn first an occupation. (2) What is the use of wealth without health; for on health not only depends the personal happiness, but also the welfare of the race? Let therefore physical fitness be the first aim. (3) What is the use of wealth and health without knowledge? For knowledge not only explains things and thus satisfies the ever-yearning craving of the soul to know but is also the vital philosopher's stone which transmutes all base metals into gold. It is by its magic secret, man has learnt to

dominate over all other creatures, to utilise the resources of the earth for his comforts and well-being—the dangerously impassable cataracts have been utilised as a motor-power to run his machines, to illuminate his house and to serve him in multifarious ways, and the awe-striking thunder of the sky as a fertiliser of his soil and to carry his message on the wings of the air, round the earth, in the twinkling of an eye. Knowledge therefore is the main source of all power, progress and prosperity and it should be the principal object of education. (4) What avail wealth, health, knowledge and success in this world, which are transitory, if they do not guarantee the redemption of the soul, which is immortal ? Religion therefore should be the main purpose of education.

From this it can be easily inferred that education should harmonise all these divergent elements according to their intrinsic order and fundamental valuation. Herbert Spencer, following biological principles says, “knowledge which subserves direct self-preservation by preventing loss of health, is of primary importance.” And next to it “knowledge which aids indirect self-preservation by facilitating the gaining of livelihood.” Third in order is the knowledge of “those activities which have for their end the rearing and discipline of the offspring.” Fourth is the knowledge of “those activities which are involved in the maintenance of proper social and political relations” and finally “those miscellaneous activities which make up the leisure part of life, devoted to the gratification of the tastes and feelings.” (Herbert Spencer : Education, P. 33-38)

But this is not all of education. Education is far

more comprehensive : it is not only to prepare life to meet its organic needs, but '*how to live*' in its widest sense. To make the best of life, not simply in the crude sense of the enjoyment of material pleasures, but in its broadest application, should be the aim and object of education.

Modern civilisation is a very complex and intricate machinery. It is the product of thousands of years of experience. It is the accumulated wisdom of the human race, and with every advancement of human progress, it takes longer and longer period as an apprenticeship for the preparation of life ; infancy is prolonged as the child has not only to learn the wisdom and the experience of his own race, but also the accomplishments of other races, in order to compete with them for adaptation and mastery, for the domination, possession and enjoyment of the resources of the earth and transmitting them to the next generation. Any race that fails to adopt the most modern method of education for the training of its new generation, seals the fate of its own destiny and is doomed to degeneracy and consequently gradual extinction, as it can not compete with races that use surer and more successful means for training its pubescents and adolescents. This is the most plastic and impressionable age for adaptability. Nature has endowed this period of life with all of her precious gifts which she has acquired through her countless years in her process of evolution, and it almost comes like a flood, which if it is properly stored, irrigates every crop that soul can bear and brings all to harvest, but if neglected, it soon passes away, leaving behind barren and sandy wastes. It behoves us

therefore that all the splendid resources of youth should be properly cultivated.

Animals, as soon as they are born, are generally almost fit or at least need but a few day's care, for the struggle of existence. The human baby is the most notable exception. If left to itself, it is entirely helpless. It needs not only care for days and months, but for years. This very helpless prolonged infancy of the human child, according to John Fiske (John Fiske : Cosmic Philosophy, vol. II. P. 342) has been a great dynamic factor in human progress : it developed in the mother the tenderest solicitation and in the father the spirit of foresight—the mother of all inventions—for the provision of the child and formed in him the cementing nucleus of the family and the society. Among the savages, the child is generally initiated into manhood at the age of 12-14, when he is taught hunting and to maintain himself independently. But in the advanced civilised community this infancy, the probationary period of manhood, has been extended to 32 to 35 years of age, nearly half the span of life. Thus adolescence is merged into infancy in the higher stage of human evolution ; for physical development is not the criterion, but the psychic growth, which is necessary in the fulfilment of the complicated task of a civilised man. One is no more able to-day to acquire sufficiently the inheritance of his own race and that of the other peoples at the age of 28 or 30 in order to be in the van of progress or to be able to contribute something to the accumulated treasures of the human knowledge.

It is therefore essential that the educational process should be economical and not wasteful of time and energy.

Education, in its generic sense, begins as the baby is born with the stimuli of the new and strange atmospheric pressure and the waves of light and sound that dash against it and to which it re-acts. Psychically it is much older.

During the gestation period, mother's mental activity and mode of living impress indelibly on the baby's nervous constitution. Morphologically, the baby is the resultant growth of the impregnated spermatozoa and ovum—the amphimixis of the germplasms of both the parents—inheriting according to the law of selection all their characteristics, some latent and others manifest. Phylogenetically it is as ancient as life itself. We are but multicellular congregations, soaked in the same saline solution in which life first originated as a protoplasmic speck.* Ontogenesis, the development of the individual, is a short and quick re-capitulation of the phylogenesis. The human embryo passes in a day the cycle in the mother's womb, which it took nature to develop millions of years in the process of evolution of morphological adaptation and inheritance. The child's mind therefore is no *tabula blanca*, as it is supposed by many. It is plastic in a sense, its nervous system is still adaptable to a rational regime, being yet in a formative state, though having a rich ancestral history. It is really fortunate that the human baby is born so unlike the animals who come to the earth with already developed and fixed nervous structure and consequently can make very little further progress.

It is the function of education to shape and mould, out

*Sea-water has almost the same mineral composition as blood.

of this plastic material of human life, the best that can be made for the individual as well as for the society. The most successful results are obtained when nature's slow and laborious course is followed with unabating zeal. The child is no miniature man. He can not be made into a philosopher by the rush and hurry of the teacher. If the tadpole stage of the child's education is prematurely cut, it will simply cause its degeneracy. Nature meant for the tadpole to absorb its tail slowly and then to turn into a frog ; and it was the best educative process.

II.

Educative Process.

The amoeba, the unicellular creature at the lowest scale of animal life, has as in all animal organisms, four functions : nutrition, locomotion, sensation and reproduction ; but it has no special differentiated organ for their functioning. And as we ascend the ladder of life, we find the same four functions and no more. But there is a tendency in nature ever to do better and better, more efficiently and economically ; hence special organs are developed. For an organism that has specially trained specified cells to digest, to move, to feel and to reproduce proves his superiority over the other, as a trained carpenter proves his superiority over a village Jack-of-all trades. And as the function determines the

structure, so the complex organs of the multicellular organisms developed through differentiation of function.

Yet the amoeba, though it has not any nervous structure, possesses certain educability. It has been proved that if amoeba is slowly acclimatised in warm water, it can bear and thrive in a temperature which would kill instantly its ancestors.

The nervous structure is a development to receive the external stimuli through sensation and to react to it as a process of organic economy. It consists of neural cells. A neuron has a nucleid body in its centre, round which there is a cylindrical axis, from which branch out fibril like dendrites. The function of the branching out of these fibrils, is to co-ordinate the adjustments between stimuli and re-actions, the conduction of the nervous impulses and the reciprocal liberation of the nervous energy—a process essential for a complex multicellular mechanism. As there is no psychosis without neurosis, and both are concomitant, we can say that the psychic life (soul) begins with the growth and development of the neuron-cell.

Among the radiata, the beginning of the neural cell differentiation is observed. In the star-fish there is a ganglion in association with the oesophageal ring. It reacts to stimuli. In the molusca, the ganglionic cell is much advanced in its evolution and it has developed two sensory nerve fibres. Among the arthropoda it is much more complicated and they show a certain amount of intelligence. Among the vertebrates there is an axial addition of the ganglionic structure, composed of gray and white matter. Fishes have both cerebellum and

cerebrum, but among the reptiles, the cerebrum begins to appear larger and larger and they have already differentiation into distinct lobes. The nervous organisation of the birds shows a much more pronounced advancement, in structure, composition, differentiation and volume in relation to the body-proportion and weight.

The brain structure of the mammals shows its superiority over the birds in two specially noticeable directions, that is, in voluminous quantity and quality as well as in convolutions, giving thereby a wider surface.

The human nervous system mainly consists of the *spinal cord, rhombence phalon, mesencephalon, cerebral hemispheres, cerebellum* and *the blood vessels*.

The Spinal cord is divided into cervical, thoracic, lumbar and sacral segments, or known as, *Conus Medularis*. The cord is divided into two halves by an anterior and posterior median fissure, containing pia-mater and important blood vessels. A transverse section shows that it consists of a central gray and a peripheral white substance. The gray substance presents two symmetrical halves united by a Central Canal and each half is called *Cornua* or the posterior and the anterior *Cornus*, surrounded at the end by a gelatinous substance of Rolando. The gray substance is essentially composed of cells and the white substance is composed of the fibres originating from the cells of the gray matter. These fibres, bundles or columns consist of sensory and centripetal neurons and they are the motor pathways. The *Medulla Oblongata* is the upward continuation of the Spinal cord and these regions are supplied with blood by three main arteries and the veins are situated along the anterior and

the posterior fissures of the cord. Lymph spaces are found around the nerve cells and blood-vessels.

Mesencephalon or the Middle brain connects the Medulla and the Pons below with the Forebrain above. The Crura spread in their upward direction and penetrate the brain under the Optic tracts between the third (oculomotor) and the fourth (pathetic) nerves. The anterior quadrigeminal bodies with their brachia and geniculate tracks belong to the Optic Apparatus, while the posterior parts with their attachments form part of the Auditory Apparatus.

The Cerebral Hemispheres are two heavy nervous masses, symmetrical in size and ovoid in shape, occupying the cranial cavity, with uneven and broken surface by numerous fissures, sulci, lobes, lobules and convolutions. The interior consists of the Gray and the White substances, with arteries for their blood supply. The Gray substance besides having cortical gray matter, also contains isolated masses called Basal Ganglia, of Thalamus, Caudate and Lenticular nuclei. The White substance mainly consists of Corpus Callosum, Internal Capsule, Corona radiata, Association fibres and Fornix.

Cerebellum occupies the posterior fossæ of the cranium, under the occipital lobes of the cerebrum, behind the medulla oblongata and is divided like the cerebrum by fissures and sulci into lobes and lobules. Cerebellum contains principally a gray cortical mass, central white matter and several ganglionic masses of gray substance. The gray matter is represented by Dentate nucleus and accessory nuclei. The white substance, in addition to the central white mass, contains three pairs of peduncles

uniting the cerebellum with the brain, mid-brain and the spinal cord.

The brain is supplied with blood by two internal carotids and the vertebrals. The internal carotid arteries divide into anterior and middle cerebral arteries and posterior communicating. The anterior cerebral arteries supply the frontal and olfactory lobes, the optic nerves, corpus callosum and anterior perforated space. The middle cerebral arteries, the largest of the internal carotid branches, supply the frontal, parietal and temporal lobes and through the anterior perforated space branches to the basal ganglia. The vertebral arteries branches of the sub-clavian, meet at the lower border of the pons, unite and form the basilar arterial trunk which running in middle of the pons, divides at its upper border into two posterior cerebral arteries. At the base of the brain, the internal carotids and the vertebrals join and form the Circle of Willis. The characteristic feature of the blood vessels of the brain is that they are terminal and they do not anastomose with each other. Cerebral veins do not accompany the arteries, but open in various sinuses.

Histologically the Nerve-cell consists of a protoplasmic body in the centre of which is nucleus with a nucleolus, lacking capsule as in the sympathetic and spinal ganglia. The protoplasm contains granular masses of yellowish pigment and according to the stain devised by Ramony Cajal, it can be demonstrated that the cell is composed of delicate fibrils known as neuro-fibrils. Of course there are various forms of cells, as bipolar, multipolar, Purkinje's cells and basket cells. Each cell is provided with 'axon' and when prolonged it branches out and

gets a coating called myelin, and is then known as nerve-fibre. Neuron is the collective name of the cell-body, axon and dendrites.

Chemically it has been very hard to take the exact analysis of the nerve-cell, owing to the difficulty of separating the different tissue elements from the central nervous organ and the nerves. But recent researches have shown that the brain and the nerve contain different kinds of protein that occur in the protoplasm. Some of these proteins are insoluble in water and in neutral salt solutions, resembling the stroma substances of the muscles and cells, while others are soluble in them, as nucleoproteins and globulins, containing 0.5 per cent phosphorus and adenine and guanine as cleavage products, but no hypoxanthine. There are also two kinds of globulins. Neurokeratin is found in the sheath. All these substances belong to the gray matter and the axis-cylinders of the brain. Protagon, a mixture of phosphatides with non-phosphorised cerebrin, is the chief constituent of the white substance. Lecithin and cephalin are found abundantly, as well as various brain phosphatides. Cholesterin is found in a small quantity. Fatty acids and neutral fats can be prepared by decomposition of phosphatides. The extractive bodies are almost the same as in the muscles, creatine, purine bases, inositol, choline, paralactic, phosphocarnic and uric acids. According to an analysis by Koch of Corpus callosum of a woman, he gave the following result in proportion to 1000 parts:—water 679.7 ; protein, 32.0 ; nucleoprotein, 37.0 ; neurokeratin, 27 ; extractives (water soluble) 15.1 ; lecithin, 51.9 ; cephalin and myelin, 34.9 ;

phrenosin and kerasin, 45.7 ; cholesterolin, 48.6 ; sulphurised substance, 14.0 ; mineral bodies, 8.2. The mineral substances vary according to Geoghegan from 2.96 to 7.8 P.C. The gray substance yields an alkaline ash and the white an acid ash.

The brain is surrounded by three membranes, dura-mater, arachnoid and pia-mater, possibly to absorb the shocks.

Though anatomically the brain presents homogeneous masses of gray and white matter, physiologically it is composed of different centres or localisations, the functions of which are different from each other. The motor area of the cortex occupies the ascending frontal and ascending parietal convolution, also the paracentral lobule controlling each individual muscle or groups of muscles of the opposite side of the body. The centre for the lower extremities occupies the paracentral lobule and the upper fourth of both rolandic convolutions, more of the frontal than of the parietal. The two middle fourths represent the centre for the upper extremities. The centre of the head lies in the lower fourth and in the rolandic operculum. The centre for the trunk lies between those of the two extremities. Clinical observations have shown that in each of the above areas, exist secondary centres, which correspond to the function of the muscles of segments of the limbs. Thus there are centres for the shoulder, elbow, wrist, fingers, thigh, knee, ankle, toes. For the head individual centres control the movements of the face, tongue, lips, pharynx and larynx. The larynx has two centres, one for each of its two functions, respiration and phonation. The centre for the

conjugate deviation of the head and eyes lies at the foot of the second frontal convolution.

There are also bilateral centres which control muscles of both sides of the body, that is, a group of muscles is under the influence of centres of both hemispheres, *e. g.* the muscles of the eye, tongue, larynx and the muscles of respiration and mastication.

Speech centres are four in number, located along the Sylvian fissure in the left hemisphere for the right handed and in the right hemisphere for the left-handed persons ; of which one serves to receive words, another to read words, the third to express in an articulate language what is heard or seen and the fourth to express them through writing. The centre of auditory image for comprehending spoken words, occupies the posterior fourth of the first temporal convolution. A lesion of this centre causes a kind of sensory aphasia known as word deafness. The centre for visual graphic image for distinguishing written or printed words, occupies the left angular gyrus. A lesion of this centre causes a kind of sensory aphasia known as alexia, word-blindness. The centre for the faculty of writing lies at the foot of the second frontal convolution, a lesion of which produces inability to write, known as agraphia. The motor centre for pronouncing and articulating words, occupies the foot of the third frontal convolution. A lesion of this centre causes motor aphasia (aphemia).

The sensory centres for experiencing the general sensations of touch, pain, temperature, that is, the muscular sense, is superimposed with the motor centres with this difference that the sensory area occupies a larger area of the parietal lobe than the motor.

The visual centres occupy the cuneus and the calcarine fissure in either hemisphere and a lesion in the area of either of the hemisphere will produce hemianopsia, that is, blindness in one half both eyes on the side opposite to the lesion. The occipital lobe is connected with subcortical centres of the visual apparatus, that is with anterior quadrigeminal bodies, pulvinar and external geniculate bodies by means of the fibres of the optic radiations which pass through retro-lenticular segment of the internal capsule, and a lesion in any of these areas causes blindness.

‘Intelligence is the result of the co-ordination of all these centres and of the association fibres which serve to connect them.’

III

Recapitulation Theory and its significance in Education.

As the human embryo passes in quick and rapid successions which in nature took millions of years, through morphological transformations of its ancestral phylum, so “one may easily detect in the evolution of the human brain a state corresponding to that of the brain of fishes, but while the fishes permanently retain this brain structure, an advance occurs in man and the brain acquires character of the reptilian encephalon ; later on it progresses again and acquires bird characteristics and

finally it acquires those characters which are peculiar to mankind." (H. De Varigny : *Experimental Evolution*, P. 35) And the conserving influence of heredity is well known. Nothing is lost of the ancestral memory. Man is born perhaps with a more varied and richer inheritance of instincts than any other animal. Quite a few may have been faint and weakened by the distance they have travelled from their primitive origin, a few others might have been modified more or less by the complexity of their cross currents, environmental and educational influences might have changed the course of a few and created new pathways for their nervous discharge, but all are there if not in the conscious memory, at least in the subconscious soul. "Every experience we have had lies dormant within us : the human soul is like a deep and sombre vale, of which light reveals only the surface ; beneath there lives a whole world of animals and plants, which a storm or an earthquake may suddenly bring to light before the astonished consciousness. Both theory and fact agree in showing that in the moral, no less than in the physical world, nothing is lost. An impression made on the nervous system, occasions permanent change in the cerebral structure and produces a light effect on the mind—whatever may be understood by that term. A nervous impression is no momentary phenomenon that appears and disappears, but rather a fact which leaves behind it a lasting result—something added to previous experience and attaching to it ever afterward. Not, however that the perception exists continuously in the consciousness, but it does continue in the mind in such a manner that it may be recalled to consciousness". (A. Ribot : *Heredity*, P. 48).

Mosso says : "Destiny leads each one of us with a fatal inheritance. Though we were abandoned in a forest, imprisoned in the dungeon in a tower, without a guide, without example, without light, there would yet awake in us like a mysterious dream, the experience of our parents and our earliest ancestors. What we call instinct is the voice of past generations reverberating like a distant echo in the cells of the nervous system. We feel the breath, the advice, the experience of all men, from those who lived on acorns and struggled with the wild beasts, dying naked in the forest, down to the virtue of our father, to the fear and love of our mother." (A. Mosso : Fear, P. 63).

But this by no means is a fatalistic theory of life. Only it teaches us that if proper care is taken in the selection of mates, as one does in animal breeding or in flower culture, a new race can be developed in a few generations which, for its physical and mental endowments, would be regarded nothing less than super-human from our present conception of a human being. However from the pedagogic point of view, there should be no theory of pre-destination. A child, unless fatally handicapped through hereditary mal-formations, has any possibility. For no two parents are alike either in heredity or in characteristics, and the defect of germplasm of one parent may be counter-acted by that of the other through natural selection of idio-plasms in the embryonic process of growth. Suppose a man has 24 sets of characters, any single individual may produce 4096 different combinations of characters and the number producable by two given parents runs up to more than 500,000. According to

Galton's theory, the child inherits only half from his parents, that is one fourth from each of them, one fourth from grand parents, one eighth from great grand parents and so on in geometric proportion. According to Mandeleian theory, which he found out through his experiments with peas, there are recessive and dominant characteristics, and recessive characteristics though latent are transmissible in every third generation—that is, alternate heredity. There is also direct lineal heredity, the father transmitting his characteristics to the son and the mother to the daughter. Due to some molecular changes in the germplasm, there may be an atavistic tendency—that is, reversal to the ancestral type as is sometimes manifest in the thick hairy coating of the body, rudimentary tail multiple mammary glands, club foot, gill-cleft on the neck, etc, indicating that the recapitulation has not been complete in those parts.

The recapitulation in the nervous system of the human child seems to be pretty well complete in its presimian ancestry, as will be seen from the following table, calculated to show how manifold certain organs increase from birth to maturity:—Testes, 60 times; muscles, 48; pancreas, 28; skeleton, 26; lungs, 20; stomach and alimentary canal, 20; spleen, 18; liver, 13.6; ovaries, 13; heart, 12.5; kidneys, 12; skin 12; salivary glands, 10.7; spinal cord, 7; thyroid gland, 4.7; brain, 3.7; eye, 1.7 suprarenal capsules, 0.9; thymus, 0.1. (Vierordt: *Physiol. des Kindesalters* p. 254.)

And fortunately though the brain is well-formed as only 3.7 folds it gets developed up to maturity, and is nevertheless in a plastic condition for adaptability.

"Education consists in modifications of the central nervous system. For this experience the cell elements are well fitted. They are plastic in the sense that their connections are not rigidly fixed and they remember, or to use a physiological expression, tend to repeat previous re-actions. By virtue of these powers, the cells can adjust themselves to new surroundings and further learn to respond with great precision and celerity to such impulses as are familiar because important. In its size and development the central nervous system is precocious. Long before birth all the cells destined to compose it are already formed, though by no means all are developed in the sense that they have acquired the form and connections characteristic for those at maturity. At the close of the embryonic life the sensory nerves rapidly extend and the connection of the central cells with limiting surface of the body being thus established, all experiences become those of education. The act of living is thus the most important natural educational process with which the human body has to do, yet it is usual to restrict the term of education to a series of formal events falling within the period of school life."

"In the development of the central system it is found that an anatomical frame-work is first formed. In this frame-work are represented, in outline, the nerve structures, whose functions are most fundamental. These with later growth are locally strengthened and organised, and by the establishment of the associative paths gain both a wider influence and greater complexity of reaction. In the history of this unfolding of the nervous centres, atavistic tendencies crop out. Most interesting perhaps

are the prehensible powers of the great toe and the clinging powers of the infants during the first four weeks of life. These capacities like the sucking reflex, disappear sooner or later, leaving no trace behind, but there can be little doubt that the proper centres concerned would show an histological basis for the reactions. It is but rarely that a vanishing power can be thus tracked, but there is ample suggestion that many ancestral phases are for a time exhibited and then outgrown by the maturing brain. Such is the development from the standpoint of the increasing organisation of the system at large. Among the sensory and central constituents are changes of a different sort. In the very young the mental processes are limited by the fact that memory is very poor. As this power increases it is possible to hold mental image for a longer time." (H. H. Donalds. *The Growth of the Brain*, P. 336-338.)

From the foregoing remarks it is evident that it is a mistake to limit the possibility of any child under rational regime ; for the law of heredity is still not well known and it is yet mysterious and evasive. However if there is any marked nervous degeneracy and pathogenesis in both the parents, it is very likely that the defect is accentuated in the offspring. Otherwise it is very hard to say anything from features. The phrenological theory, founded by Gall and Spetzheim, to divine the psychic qualities by examining the bumps on the skull, has been found to be erroneous. The shape of the cranium has nothing to do with the mental qualities, it simply indicates the racial type, and it persists longer even after the function has degenerated as in the presence of the optic

lobes of the blind cave fishes who have lost eye-sight by non-use. Nor the size of the head proves any thing. It is true that in the zoological scale the increase of intelligence has been co-relative with the increase of the cerebral mass and consequently the cranium, but the elephant, dolphin and the whale have larger and heavier brain than human beings; and are they more intelligent than man? The cranial capacity of the gorilla is about 600 cubic centimetre, of the most miserable African negro about 1250 c. c. of the average male European 1450 c. c., of the average European female about 1250 c. c. The cranium capacity of a wretched African negro is almost the same as that of an European woman, who excels the former in intelligence as a human being excels a monkey. Nor the brain weight leads us much further. The brain of Cuvier, the naturalist, weighed 1829g and next to him that of Abercrombie the physician, 1780 g. and that of Arnoldi, the orientalist 1730 g.—the heaviest weight known of men of genius, but this has been exceeded by the brain weight of many ignorant peasants and even by idiots, while some of the great scholars had brain weight less than the average, as that of Fallmerayer, the historian, 1349 g. Liebig the chemist 1352 g. Tiedemann the physiologist, 1254 g. Harles, the chemist, 1234 g. and Dollinger, the physiologist, 1207g (C. Lombroso : The man of Genius, P. 10). In a disease of the brain known as Macrocephally due to syphilis and alcoholism of the parents, the cerebral mass undergoes degenerating changes enlarging the volume. The body ratio is just as illusive. Fishes have one part of brain for 1000 parts of body weight, and one part of brain for seven parts of nervous

system ; mammals have one part brain for 200 parts of body weight and three parts brain for one part nervous system ; birds have one part brain for 100 parts of body weight and five parts of brain for one part of nervous system ; man has one part of brain for 50 parts of body weight and 30 parts of brain for one part of nervous system. But this ratio is not always relative to the scale of mentality. Proportionately a sheep has more brain weight than that of an elephant, but it is well known that an elephant is far more intelligent than a sheep ; in the same scale ants and bees have more brain weight than that of man, yet any comparison is absurd. The body height has neither any thing to do with the brain power. Many of the greatest men of genius of the world were short men *e.g.* Alexander, Aristotle, Plato, Epicurus, Horace, Philophemon, Narses, Laertes, Archimedes, Biogenes, Attila, Erasmus, Spinoza, Montagne, Mozart, Napoleon, Goldsmith, Balzac, Thiers, Ibsen, etc.

From this it is evident that it is not in the quantity of the cerebral mass which is simply the indication of the racial progress, but in the quality of the nervous cells and in their power of co-ordination, cohesion and comparison, lies the general intelligence of the individual.

IV. ,

Intelligence and Memory.

The nerve fibre has two fundamental qualities, excitability and conductivity. The excitants may be (1)

artificial, as electric shocks, chemical irritants, pinching or biting ; (2) physical as heat and cold or acting on nerve endings of special organs optic and auditory, through light and sound and (3) automatic as thoughts and emotions. In all these cases the transmission is activated through molecular motion at the rate of 32 meters per second for motor nerves and 60 meters per second for sensory nerves. Motor nerves are those which generate energy in their cells and transmit it to peripheral organs ; they are also called centrifugal and efferent nerves. Sensory nerves are those which bring the sensations (impressions) from the peripherals to the cells and they are also called centripetal and afferent nerves.

The nervous organisation can be fittingly compared to the telephone system. The brain is the central exchange : the sensory nerves are the telephone wires : sensation on the nerve endings is the telephone call : the motor response is the operator's connection : and finally the re-action is the exchange of the message. And as the wires are insulated with silk or guttaparcha to prevent the escape of the electric current, so myeline acts as insulator on the nerve fibres. Like a complex network nerves are everywhere throughout the body and it is impossible to strike any part of the body with the end of a pin without touching some nerve connections. To make the simile more complete ; if the wires are defective either due to defective insulation or breakage, or if the operator is absent or negligent to put the connections together at the exchange, or if the power station, due to breakage of its mechanism or faulty management, fails to charge the wires with current, the telephone communication can not

take place, or if any of its apparatus is defective it is indistinct. So in the nervous system, if the dendrites do not meet each other, or connect each other incompletely lacking either stimuli or tonicity, or if the motor cell either due to pathologic degeneration or hereditary taint, does not generate nervous energy or does it insufficiently, the reflex arc is missing or defective as the case may be.

From the cranial cavity descends as a branch of the brain, eighteen bundles of nerves through the spinal column as a main cable line, and it connects with the sympathetic nervous system. There are forty three pairs of cerebro-spinal nerves, of which the first twelve emerge from the encephalic grey matter and leave the cranium cavity through different openings, found at the base of the cranium, and they are known as the cranial nerves and they supply the nerves to the annexed organs, tongue, pharynx and larynx. One pair only, the tenth, enters into the heart, lungs and the stomach. The rest thirty one pairs branch out successively as they descend the spinal column from the main cable and spread over legs, arms and the rest of the body. These are also called life-nerves, for they bring us into touch with the external world and by their means we make all voluntary movements.

The sympathetic nervous system is composed of twenty four ganglionic nodules and their branches in the lungs, in the arterial walls, thoracic and abdominal viscera, connected with two cerebro-spinal nervous chains. This is also called vegetative system or abdominal brain, for independently of the brain, that is cerebral function, in case it is paralysed or degenerated, one can still keep himself alive by its means, though apparently unconscious

and lacking power of movement. It is as well known as the vaso-motor system, for by its extension in the arterial walls, it can constrict or enlarge the blood vessels.

There are only a few parts of the body that are not provided with the nervous connection, as the upper part of the hair, nail and the enamel of the teeth. From the rest of the body all the impressions are carried to the centre, the lobule in the brain, by the peripheral nerves and there by the motor cell, the reaction is formed known as the reflex arc. Thus for example, a strong light falls on the eyes and at once the retinal nerve transmits its impression to the optic lobule and if by comparison it finds—for all previous experience is stored up in the cells as a gramophone record or dry battery—that it is unpleasant or harmful to the eye, the motor nerve orders iris to contract. The dazzling light or deadening sound makes one momentarily blind or deaf as the intensity of light or sound exhausts temporarily the nervous energy of the sensory fibres, connected with the optic or auditory centres, and it takes a few minutes for them to recuperate. Normal reflex therefore is the indication of the soundness of both sensory and motor apparatus.

But to make this reflex sure and certain, it is necessary that the cells should have some previous training. All consciousness is due to the power of comparison of the cells, and cells can not compare unless they have had previous experience. Experience is the repetition of the same phenomena, which facilitates knowledge. A child may be born with perfectly healthy and sound optic and auditory systems, but if he has never seen light or heard

sound, within a few years he would be both blind and deaf; for the functions degenerate by non-use. The human nervous system is not like a continuous telephonic copper wire but consists of numerous cells which join together by elongating their dendrites and thereby creating a nervous track and consequently a continuous connection. This repetition is necessary so that the cells learn where and how to connect to be able to carry the traffic of impression more quickly and efficiently; otherwise the nervous energy may be diffused. It is just like a road made in a swamp and marshy land on which the people can bring their wagon-loads quicker and better than without it. The formation of the centres, that is the localisations of the brain for the sense perception and images, has also this great advantage that it can not only function better by specialisation, but it also can act independently and is not affected vitally if the neighbouring lobes are damaged or degenerated. Memory therefore depends on the integrity of the nervous cells and their ability to make quick and rapid nervous pathway which they learn by the repetition of the same experience. Anything that damages the cells—alcoholism and syphilis, fear or terror which rob them of their tonicity and make them shrink in size and incapable of expanding any more and making adequate connections, or intestinal intoxication which irrigates the brain with toxic blood—impairs the memory and if long continued gives rise to neurasthenia which means weakness of the nerve from the Greek words, neuron (nerve) a (negative, lacking) sthenos (force, strength).

But as long as the nerve cells are healthy, that is, have

no hereditary taint, education can work out miracles ; and it is the function of education to fix the path-ways of these nerve cells whose activities are useful to the community and to inhibit those which are detrimental to the social progress and which have only survived as an inheritance from remote animal ancestry or savage past and have not yet been completely atrophied.

The human child has this great advantage over animals that when animals are born their nervous pathways have been already fixed, known as reflex instincts, and it is hard to change them ; but in the human baby, the pathways are yet to be fixed, only the cells have been formed. Memory is the consciousness of the cells of the repetition of the same nervous traffic, and intelligence is the power of the different groups of cells to co-ordinate and compare their activities and their stored-up impressions. Here is a great educative possibility and educational opportunity.

V

Physical Education.

It is one of the wise sayings of Confucius : (Koung-Fou-Tseu, 551-479 B. C.) "What Heaven has conferred is called the Nature : an accordance with that path of Nature is called the Path of Duty : the regulation of this path is called Instruction"; (Legge-Religion of China, P. 139) and modern psychology could not improve on that definition. There has never been any question as

to the fundamental value and importance of instruction ; it is acknowledged by all that education is the guardian of civilisation, the transmitter of its products, the treasure-house of its precious heritage from the magic temple of knowledge which has taken more than hundred centuries to build up. But there has always been a difference of opinion as to the methods to be applied to bring out the best results. Socrates called teaching intellectual midwifery, for it assists the mind to bring forth new ideas. The Hindus call and regard their teacher (guru) as their father, for mental reproduction is only possible when mind has been fertilised by spiritual seed and is fruitful in conception. After the instruction (*upabit*, initiation) the student becomes '*dijja*' (twice-born) that is, he is born again in the psychic sphere and it is a new birth to him, in an enlarged and enriched mental kingdom. But it is a well-known fact, attested by numerous observations in every day's obstetrical experience that if the delivery is forced prematurely, it might cause still-birth or invalidate the body, if special precautions are not taken ; so in the psychic domain. The child is no miniature man. Education has to be applied to him, evaluating knowledge to the terms of the child mind. Otherwise instead of growth, it will simply atrophy. If a child of one or two years of age was asked to exercise dumb-bells of 3 pounds of weight with his tiny muscles in order to improve them and if he was forced into it, instead of improving his health, it will simply cause him irreparable injury. Yet if the child is patiently trained, he can be made in a few years to bear many times its weight and improve thereby. In the intellectual life it is just the same. Precocious

mental exercise is injurious to the child. Utility and patience have been the watch-word of nature, they should also be that of parents and the school-master.

The human child at his birth, we have shown before, has almost passed the recapitulation cycle of the animal stage. Yet the memory is not yet developed ; associational co-relatives are not yet formed. For some years, a child's will is unstable. He can not keep his attention on anything for a long time. He is largely subject to impulse. His mental images are yet blurred and indistinct. The intuitive powers are weak, but the expressive powers strong. Ideas act themselves quickly but they do not stay long enough for reasoning process. To think is to act for a child—the typical illustration of ideo-motor action. He can not yet differentiate between the subjective and the objective images. He loves to play and he believes his dolls have life like him. And play is the most wholesome education for him. For through play, he passes quickly the larval-stage of ancestral recapitulation, possibly of remote past in the infancy of man, when these activities were co-relative to his structural and psychic needs. Any impediment to the expression of that instinct, or the shortening of that period is as injurious to the child, and to his further development as the cutting of the tail of a tadpole is to its growth. The play is normal to the child, and the longer the child plays, it is better for his personal and consequently communal growth, for longer the childhood, higher is the race welfare as higher the civilisation longer is the period for educability. When and where children would not play, it simply means race fatigue and exhaustion.

There are various theories as to the origin of play. Herbert Spencer and Schiller think play is a vent for superfluous energy. Lazarus is of opinion that it is meant for recreation. Froebel interprets play as one of the child's highest mode of self-expression. "We should not consider play as a frivolous thing, on the contrary, it is a thing of profound significance. By means of play the child expands in joy as the flower expands when it proceeds from the bud ; for joy is the soul of all actions of that age." Stanley Hall thinks the young play in response to inherited memory of the past experience of the race. According to Karl Groos the young play in order to prepare for the future serious occupations, for play is the pleasant way of nature's method of training to meet the tasks of life. Kitten's ball is the cat's mouse, the girl's doll is the school in motherhood. He says, "In the attempt to form a biological estimate of play independently of the Lamarkian principle we must constantly bear in mind the value and origin of youthful play and therefore we must begin with instinct in its more limited sense. We find in all creatures a number of innate capacities which are essential for the preservation of the species. In many animals these capacities appear as finely developed reflexes and instincts, needing but little if any practice for the fulfilment of their function. With the higher animals, above all with man, it is essentially otherwise. Although the number of his hereditary instincts is considerable perhaps larger than any other creature, yet he comes into the world an absolutely helpless and undeveloped being which must grow in every other sense, as well as physically, in order to be an in-

dividual of independent capabilities. The period of youth renders such growth possible. If it is asked why an arrangement apparently so awkward has arisen, we may reply that instinctive apparatus being inadequate for his life-tasks, a period of parental protection is necessary to enable him to acquire imitatively and experimentally the capacities adapted to his individual needs. The more complicated the life-tasks, the more necessary are these preparations ; the longer this natural education continues, the more vivid do the inherited capacities become. Play is the agency employed to develop crude powers and prepares them for life's uses and from our biological standpoint we can say : From the moment when the intellectual development of a species becomes more useful in the struggle for life than the most perfect instinct, will natural selection favour those individuals in whom the less elaborated faculties have more chance of being worked out by practice under the protection of parents—that is to say, those individuals that play. Play depends then, first of all on the elaboration of immature capacities to full quality with perfected instinct and secondly on the evolution of hereditary qualities to a degree far transcending this, to state of adaptability and versatility surpassing the most perfect instinct." (Karl Groos : *The Play of Man*, P. 374).

The play instinct of man may be due to the recapitulation stage of the presimian, simian and savage life. The child revels in the arboreal life—climbing trees and gathering fruits and flowers—climbing, swimming and fishing and delighting in all the pantomime mimicry of savagery as hunting and fighting. These exercises train the co-

ordination and development of muscles, power of observation, quickness of determination, agility of movement, a sense of reality and a joy and triumph in the achievement of success. This feral impulse should therefore be fed and formed and allowed complete expression. Heredity is nothing but cell-memory and it longs to revive the ancestral experiences and occupations of the race. Montessory utilises them for educational purpose.

Cerebral process is a late development either in the phylogenetic or in the ontogenetic scale of evolution. Heinrich Schmidt estimates the existence of man as 240,000 years. It may have lasted much longer, but it can not have lasted far less. If this period is represented by a day of 12 hours, then each hour would represent 20,000 years, each minute $333\frac{1}{2}$ years. If we imagine that we are living at the noon hour, the startling fact comes out that for over eleven and a half hours there is nothing on record. At 20 minutes before twelve the earliest vestige of Egyptian and Babylonian civilisation began to appear. Greek literature is seven minutes old. The steam engine is only half a minute old. (Journal of Philosophy and Psychology May 11, 1911).

From the foregoing comparison it is apparent that the veneer of civilisation is very thin indeed and if the educational process should fail to operate and cease to function for three generations, the race would sink down quickly back to the level at which it stood at the dawn of history. Here educational process should be taken in the wider sense and not in the narrow conception of the school-room studies and lessons, which is of but secondary importance; but it should include the all-embracing environmental

influences—the social institution, industrial organisation, cultural and refining process of religion, traditions, literature, press and social contract. Primitive education, like most complex modern education is but the initiative of the individual into the ways of society through the acquisition of its organised cultural possession now expanded into many subjects, requiring years for its acquisition. To speak in the biological terms, education consists in making the organism fit quickly and promptly to adapt itself to its environment. And as much of the race history has been confined in the physical plane, it is necessary that the child should apprentice through it in order to graduate himself fully into the ways of a thinking and philosophic mind.

Physical education is of fundamental importance ; it is the basic order of existence and a guarantee of the vitality and the progressive continuity of the race. Civilised man is the only exception in the animal kingdom ; he often does not perform any physical work before he receives his meal, while the animals and savages have to search and hunt a long time before they have something to eat. Muscular tonicity is essential to the life process. Without it no vital activity is possible. For respiration, for circulation of blood, for digestion, for reproduction, we need muscular contractibility. It is true that man could never compete by any physical exercise with the swiftness and agility of a deer, the power of eye-sight and flight of an eagle, the strength of an elephant, and the muscles of a lion, but he has dominated them all and utilised the resources of the earth for his comforts, only through his cerebral development. A scholar is more worth to a

nation than a thousand athletes. The value of a man to-day lies not in the size of his bi-ceps but in the power of his brain. Homer composed and sung his immortal epics while blind as Milton dictated his 'Paradise Lost' to his daughter : Aristotle the great ancient philosopher was bald, had strmmerring speech and stomach troubles : Pasteur was semi-paralytic when he gave to the world his beneficent discoveries : Darwin a life-long invalid revolutionised the perspective of man by his evolutionary theory : August Compte and Herbert Spencer, two dyspeptics gave to the world their epoch-making positive and synthetic philosophies.

Yet had they sound health, the energy that was wasted to combat with sickness could have been so well utilised for their works. And there is this difference between an ignorant but healthy savage and a physically degenerate cerebral man, that the former has a future possibility while the latter is on the declining curve of his racial life. For it should not be forgotten that for proper functioning of the cerebral activities, the brain needs to be irrigated by pure and healthy blood-supply not only for its nourishment, but also to wash away the metabolic wastes. When the muscles for lack of exercise are flabby, the heart suffers just the same, lacking its rythmic contractibility ; and digestion is weak and if proper care is not taken in dietics, due to stasis fermentation and auto-intoxication take place polluting the blood with their toxic products, which circulating in the brain reduce its working efficiency, and slowly cause in a few generations both physical and mental degeneracy leading finally to extinction.

Thus the physical basis of life can not be ignored : Nature punishes those who violate this basic principle with destruction.

This is the lesson of History illustrated in her book in letters of gold. Greece saw the light of civilisation when the people of Europe were living in caves and jungles, and the Greek civilisation was brilliant when it represented the youthful activities of man. Its philosophy was never divorced from the Olympic games, dances and music, rather it was closely associated with those activities. The Romans too in the hey-day of their glory regarded 'virtue' as 'valour' and glorified physical courage, but began to show early symptoms of senile degeneracy by the rigidity of their rules and inflexibility of their temperament. The Hindu civilisation in the very dawn of their cultural ascent was suffering from precocious senescence which is evident by the very bold and daring pessimistic speculations as to the nature of death and the life after death they indulged in, even in the Upanishadic period. The growing civilisation like growing youth first acts and then reflects : instead of metaphysical abstract speculations, it challengingly enters into the arena of action, dares achieve, and then thinks it over if it has gone wrong to utilise the experience for the future benefit. To youth nothing is impossible for accomplishment and the future is always shrouded with a roseate hue of life. This exaggerated idea of self-importance and care-free attitude of mind appear to the elders, as want of reflective judgment, but they forget this very self-intoxication is a life renewing process : for taking away all inhibiting restraint, the nervous system gets quickly refreshed and recuperated.

Thus the relation between body and mind is too close and intimate and they are united in an inseparable whole, the one reflecting on the other. Mind can only work well when the body is in a healthy condition. Physical exercise strengthens the muscles of the heart, accelerating its circulation, increasing the oxygen in-take, reducing the metabolic waste products of organic combustion into harmless excretory substances and thereby keep the arterial wall elastic and supple to perform with efficiency the bodily and nervous functions. It is however only a means to mental development and not an aim in itself and should not exceed that limit which instead of benefiting, harms the nervous system.

VI.

Intellectual Fatigue.

While in animal life the evolution has been towards physical advantages and the nervous system has been developed mainly to co-ordinate the physical activities, the physical function has been almost subordinated to the cerebral development in man by means of which he has been able not only to dominate over the plant and the animal kingdoms and to make them serve his purpose but is also learning to utilise the resources of nature for his comforts and well-being. Man does no more need to develop his organs of sight, taste or hearing when telescopes and microscopes can see for him, when chemistry can test a thing better than any animal tongue or nose

and when telephones and microphones enable him to hear farther and better than any animal ear. For what do we need great physical strength when we have giant motors, steam hammers and hydraulic presses to work for us or speed when we have motor cars and railways to run at our command? Why need we learn how to fly when we have aeroplanes for our use? What need to develop our swimming power when steamers and submarines are at our disposal? Nearly every achievement of organic excellence produced at any time during millions of years in the animal evolution, man's brain has like-wise produced and has brought to greater perfection. We see more clearly through telescopes than eagles, smell better through chemicals than dogs, hear farther through telephone than elephants and we excel in speed through our motor-cars, aeroplanes and submarines any horse on earth, any eagle in the air and fish in water, and we are stronger than the lion with our guns that can throw one fourth of a ton of projectile at the distance of seventy miles.

But an organ of such magnificent powers and far-reaching immense possibilities, is necessarily a delicate mechanism. It has been observed that many men of genius have some eccentric characteristics and on that foundation Lombroso tried to associate an alliance between them and insanity. But the fact is that men of genius working on high nervous pressure often bring its exhaustion, if proper hygeinic measures are not taken to preserve the equilibrium. Their nervous system is like a fine sensitive instrument which can do wonderful work as long as proper care is taken to keep it in order, but it easily

breaks down with rough handling, which an ordinary coarse machine can easily bear without any harm.

To accomplish any work, energy is necessary in the physical life as in mechanical activities. This energy is liberated in the body by the disintegration of the tissue and the molecular change it brings about. The principle is applicable in the generation of thought just as in the physical movement. In fact mental labour necessitates a greater expenditure of nervous energy.

The cerebral cell acts just like the muscular cell. If it is overworked, it is encumbered with products of its own decomposition ; and the auto-intoxication caused by it is more serious if the subject is young and has not yet the faculty developed to eliminate the toxic residues. These are of organic nature as uric acid (Conink), lactic acid (Mosso), cholesterine (Flint), ptomaine or leucomaine (Gautier), and they accumulating in the brain, bring about the poisoning of the nervous system and the loss of the general vitality. This devitalisation creates morbid predisposition and makes the organism an easy victim to any infectious disease.

Fatigue is always a cerebral phenomenon. Through the accumulation of acids, which diminish the alkalinity of humours, the bacteri-cidal power of the organism is lowered and as a reaction the task is put on the thyroids, which again being ever-worked, raise the temperature by excessive secretions of thyroidine in the blood current. So one can say that intellectual fatigue, through overwork, exercises its baneful effect over the entire organism.

Mental overwork (memory exercise) arrests the development of the children (Brouardel) and makes them less

vivacious. It retards the modifications that should be co-related with puberty and affects the bony structure.

The nervous system suffers in diverse ways as the evil effects of over-work. Sometimes there is simple heaviness or intense pain in the head accompanied by bleeding of the nose. The child becomes gradually indolent and lazy and losing slowly his memory loves no more his studies. But if he is forced against his will to memorise, he rapidly loses his cerebral capacity with intellectual torpor and somnolence associated with nervous irritability and vertigo, leading to congestion of the brain and occasionally to 'meningitis' (inflammation of the brain or the spinal cord).

The circulatory system suffers with palpitation and pain in the region of the heart. The pulses are short and irregular, but the cardiac beatings are very rapid (tachycardia). Occasionally the blood-vessels are contracted, thereby bringing about the coldness of the extremities of the body and the palor of the face.

The digestive system gives usually the first signal of revolt against excessive mental labour. At first there is loss of appetite, then dyspepsia and finally auto-intoxication with all its complications. Anemia is very frequent and in certain cases there is discharge of blood with feces (cruenta).

The respiratory organs are neither immune. Due to the retention of the carbonic acid gas through defective metabolism, there is often diathesis among hard-working students to tuberculosis.

The genito-urinary organs show also symptoms of troubles in the frequentation of mictation and the augmentation of the volume of urine and some times

associated with phosphaturia and the buzzing sensation in the ear.

But excessive nervous application causes more generic disturbances ; under its influence morbid characters manifest themselves. The child becomes less alert, gay and vivacious. With loss of appetite and anemia there is a sad and melancholy pathos in his face. Then dyspepsia with the absorption of its toxic and irritant decomposition products in the brain cells, makes him easily irritable, excited, impatient and angry with small trifling things. Feeling himself misunderstood, he is shy and avoids company, but the solitary brooding accentuates the very evil. During puberty he often retains the infantine, almost feminine characteristics. The indolence and laziness of which they are generally accused by parents and teachers, is nothing but the reflex of their poor organic tonicity and low vital energy. Laziness is certainly the index, if not of a grave malady, atleast of 'slowed nutrition' and slackening of the cerebral function. And it should not be forgotten that when the nervous system is weakened, a least amount of work brings exhaustion all over the body. Its devitalising effect is accentuated with every additional work, how minimum it may be. Rest then is the only cure, physical and mental, before complete recuperation has taken place.

Of course it is hard to say, what is really intellectual over-work. Necessarily it must vary according to the individual type. What is suitable and beneficial for one, may be excessive and injurious to the other. One thing is sure, a child below nine years of age is not capable of concentrated attention to anything without serious injury

to his nervous associative fibres which are yet weak. Dashed against the shore of a new, strange, cold and severe world,* he has learnt and has been learning a good deal since his birth. At six or seven years of age, he has already learnt a good deal of seeing, hearing and speaking with their associative co-related interpretations, many habits of personal hygiene and social conduct, hundreds of words and phrases, and many legends, myths and folk-tales of the race. Rather the child is using his delicate memory too much and at a top-speed. He is no more fit therefore to be put any further task or subjected to any curriculum or routine which demands concentrated attention for more than half an hour a day before he is nine years old. The child loves to be in perpetual motion. It is an organic necessity. If when he is confined to a task for more than a few minutes he shows his restlessness, it is not mischievousness or wickedness as many teachers believe, but a subconscious demand for a discharge of the nervous energy to release its tension to preserve the equilibrium.

VII

Sexual Education.

Sexual hygiene is the most delicate but vital need of modern education. On it depends much of the health

* It should not be forgotten that coming from the warm and comfortable mother's womb, the first sensation of the baby is a shivering chill, even in a tropical climate.

and happiness of the individual and vitality and progress of the race. Such an instinct as sex whose exercise unites in an unbroken chain the successive generations of past, present and future, and which might mean so much good or harm to the community, can not be left merely to the individual whims and caprices without thorough guidance and discipline of the educational system. If the object of education is to develop the best of an individual and to adapt him for the social needs and progress, sex is the vital centre whose magic touch orients and influences consciously or sub-consciously every centrifugal radiating force of life. It is the immense reservoir for potential infinite good or evil. Neglected it is apt to stagnate and pollute the society with its 'miasmal' emanations, but properly utilised, it is a great dynamic power and possibly the most potent factor for physical and intellectual development. Burbank has shown marvellous results within a comparatively short time in the creations of wonderful flowers and plants through selection ; yet man the pride, glory and master of all creations on earth leaves his procreation to half-hazard chances of exigencies like wild animals. (Harwood : New Creations in Plant Life. Jordan and Kellogg : The Scientific Aspects of Luther Burbank's work).

And the parents and the teachers often feel the delicacy to approach their children and pupils on the subject, fearing that it might simply rouse a morbid curiosity or premature sexual erethism in them. But the children finding them reluctant to speak on the subject simply learn vulgar, coarse and obscene interpretations of it from other sources ; and the glorious period of

early adolescence is clouded by evil habits contracted and indulged in under the cover of darkness. Thus pubescence instead of becoming the sweetest and most expansive period becomes a frail bark to steer its course uninstructed and unguided in the tempestuous and the dangerously rocky ocean of life. And no wonder many get ship-wrecked, for lack of knowledge on the sex question which their whole being wants to know and which consciously or subconsciously absorbs more than three fourths of their time and thought. Had it been released by proper instruction and had their curiosity been satisfied in time, much of the sexual energy and tension could perhaps be utilised for intellectual development.

This sexual stress may have its origin to the fact that in the dim past of our ancestral history, puberty was coincident with sexual activity. But now physical virility, that is the ability of procreation, which a male might attain at 16 and a female at 15, may be much earlier though physical maturity, that is, the complete organic development is not attained in man before 23 and in woman before 21. Especially, the pelvic bone, is no more the criterion of social fitness, mental maturity is rather the standard and higher the civilisation, longer the period required for education. It is not possible for a man to complete his education before 32 and for a woman before 22, and if before that age they beget children the race suffers in physical and mental vitality, being born of physically and mentally premature parents. This disharmony is due to the fact that senses are roused long before physical maturity and when he is physically

mature, he has to wait yet quite a few years for mental and economic fitness when alone one should take the responsibility of parenthood.

Youth therefore becomes a period of storm and stress. Yet he is neither taught nor trained how to fight his battles manly and bravely to a success. His sufferings and anxieties—and they are many—which the elderly men often forget as they advance in years, are more due to his individual solitary attempts to solve his problems without enlightenment from any side and the stupidities he commits in his eagerness and curiosity to know the mysteries of life and reproduction are more due to his ignorance than to perversity or irresistible sensuality of his nature. All this tremendous energy can be easily sublimated into an intellectual process if his curiosity can be satisfied without awakening the craving for sensual gratification and thus bringing poise in his soul. This can be best done and the function of the sexual organs well illustrated in the botanical lesson in the fertilisation of flowers. The influence of heredity can here be practically demonstrated and its precepts are essential to race hygiene and culture. Of course knowledge has to be imparted in the terms best assimilable in the child mind and advanced progressively from simplicity to complexity as the child grows in years. The impregnation of pistils by stamens, brought in union by wind or insects attracted by colour or aroma, or a bird egg is a better example to show the purposive utility of the animal sexual organs, being less wasteful, more sure and positive in bringing the amphimixis of paternal germplasms, the bearers of heredity. Thus awe and reverence can early be

implanted in the mind for the human sexual organs and their functioning activities, the gate to the temple of life, the holy of holies, the sublime receptacle of the most sacred inheritance of the race of which the individual is but a trustee and custodian.

No, it will not do for the teacher to stand aloof on a question of such vital importance. He should be a trusted friend and a guide by creating confidence and faith in the minds of students by his disinterested efforts to help them and holding up before them higher ideals of life. The victims should not be damned and terror-stricken by exacerating the evil consequences of their acts but be brought into healthy and wholesome life by friendly advice and solicitations to keep their minds free from lascivious thoughts and imagery. It should be made clear that intellectual activity requires a great nervous resource and reserve and a student can ill afford such an extravagant expenditure of nervous energy. Naked gymnastics, swimming or other healthful open-air exercises in the presence of the teachers or fellow students can have a very salutary effect against these evils. The boys have a horror of being objects of ridicule by their associates and it gives the teacher splendid opportunity to give the right kind of advice where it is necessary. Nudity stands for purity ; obscenity and bad habits can only be harboured behind the veil of clothes.

The dangers of sexual abuse, misuse and self-abuse should be particularly brought home before the young minds and their baneful influences on life, health and the race should be thoroughly taught with illustrations ; so that where there is even a lack of ideal, virtue should be

made out of necessity. For however impulsive a youth may be—impulsive and creeping with desire for sensuous experimentation and gratification, none is such a fool as to buy such a momentary pleasure by such a price of life-long misery, ill-health and unhappiness, if he has the unbiassed warning of medical science and hygiene and positive knowledge of its consequences. Just out of ignorance of these laws how many promising careers are blasted, how many lives made miserable, carrying their putrescent body like a living corpse, how many homes are made wretched, how many innocent wives are life-long invalidated and made sterile for no fault of theirs and how many children are born blind or with feeble eye-sight and tainted heredity only for the youthful folly of their fathers ! If education should have any pragmatical test like others, it certainly lacks in valuation by withdrawing such an essential knowledge from the school curriculum.

VIII

Female Education.

If boy is the father of man—for he will be father one day—the girl is really the mother of the race. She being of anabolic nature represents more the racial type than the catabolic male sex which tends more or less to individualistic variation. Her education therefore is of more vital importance to the race than that of man. The child is more intimately related to the mother than to

the father; her influence is so preponderant. Man's germplasm only starts the vital process of growth, through amphimixis with ovum by reducing the chromosomes, which liberating the tension gives momentum to the cell division; as the volume growing faster than the surface, either the cell must die or grow into daughter cells. But it is the mother that gives it the nutrition and out of her own blood makes it live and thrive in her own bosom for more than nine months. Her every nerve impulse has gone to automatically stimulate and build up its tiny neural cells. Her every thought-current and heart-beat have reflected on it an ineffacable mark. Even after birth, her nursing and love make it possible for him to live and grow. In a true psychological sense, home, school and other environmental impressions are but her wider womb. She makes the race in a sense more than physical. It is the mother's voice that teaches the child how to speak and as it grows she imparts to it with her inexhaustible mother's love, the racial language, its traditions, lore and wisdom. Home is the greatest school and mother is the highest teacher. In comparison with her influence, colleges and universities are of but insignificantly secondary importance. To enable her to fulfil that noble task with conscious pride and ability—a task which she now almost performs unconsciously and without training, which of course means a great inefficiency, should be the aim of female education.

Man in his vanity and arrogance of androcentric civilisation has made the creator a masculine God. But it is a great contribution of the Hindu genius to have conceived of a divine mother. The western female

education has been a sad failure. They have tried to educate woman as an imitation of man, and the result has been that her mental orbit has shifted, with the gravitation of her soul, from the true path destiny has ordained for her and instead of harmony and co-operation between man and woman there is sex-tension and antagonism, political rivalry and economic competition. When woman competes with man for economic rights, it leads to the degradation of both. Progressive differentiation of sexes, as civilisation advances, is the law of evolution. She can not be both a wage-earner and mother. Industrial life incapacitates her for motherhood. Physically and mentally she is not fit to enter into the arena of commercialism without serious injury. It coarsens her moral fibre, robs her of her idealism, dries the fountain of her emotions and she gradually learns to be self-centred and to make self-indulgence the worthy object of life.

Woman has always ruled man, but not by force. Her frown has been bitterer than gall, her tears more piercing than sword, her smiles more stimulating than the ambrosia of the gods. In the history of the world a great man could not be found who has not owed his genius to the inspiration of some woman, either mother, sister, wife, daughter or a particular friend. What is the source of her power? A few years ago, when on a journey to Ammarnath, near Shishnag, I remember to have had a conversation with an English principal of a Punjab college who, when seeing the women pilgrims almost bare-footed and insufficiently clad, shivering with cold and treading their way cheerfully over a dangerous defile made slippery by the melted snow of the glacier, remarked to me, knowing

my zeal for social reform, that I could not expect much from such a material. I told him that this tremendous mis-directed energy needs only to be slowly put in the right direction without breaking the continuity of the psychic consciousness and stimuli. That they are capable of such sacrifice and effort for an ideal, however wrongly conceived, is a sure indication of their moral vitality and a guarantee of their future progress. That Sita followed her beggarly husband, leaving palace and comforts, and disdained the love of a mighty emperor, that Padmini plunged herself into flame to save her honour and that of her husband rather than enter into the harem of the imperial victor—these are priceless heritage of the race. The story of Sita may be legendary ; but it reflects the psychology of the people. It is the moral stamina that counts. Empires may rise and fall, dynasties may appear and vanish away, a nation may be victorious or vanquished in the cycle of time, but no great race has ever perished as long as it possessed the soul qualities that are regenerative. Yes, soul-quality is the essential thing, the great racial hereditary treasure, richer in fundamental valuation than any other kind of wealth in the world : other things are but froth and efferevescence on the surface of time. Where are to-day Alexander and Hannibal, Chenzigh Khan and Timurlane, Atilla and Napoleon ? But Confucius, Buddha and Christ by their moral virtue are still more potent than mightiest of conquerors.

Woman wields power over man, for she being of anabolic nature, possesses more reserve of potential moral courage. She can feel more, suffer, endure, nay even sacrifice herself, if needs be, for her child, for her beloved,

for her brother, father and for her friends. In this capacity and capability of suffering and feeling and experiencing joy in her self-sacrifice for the happiness of those she loves, lies the real secret of her strength. It is not her intellect but her heart that is dynamic. Her heart is the perennial fountain of renewal and re-juvenescence of the racial energy. As long as the womanhood of a nation possesses that deep, intense, pulsating and throbbing heart, that race is young, inspite of her oldest traditions as India, Japan, and China. As soon as woman becomes self-centred, thinking and calculating more of her happiness and gratification than that of her children, estimating the commercial advantages of the barter of youth, beauty, vanity of feminine coquetry and conquests more than motherhood and its sacrifice, when emotions are dried and feelings are subordinated to considerations of luxury and comforts, that is in one word when the soul has lost its moral strength and has been only opportunistic in out-look of life, that race however young may be her history, brilliant her present succees, is already prematurely senile, parched and bankrupt and will vanish away like the Babylonian civilisation.

To keep her soul plastic, and receptive, to deepen and intensify her emotional life, to strengthen her moral fervour to prepare her for an ideal motherhood to which her every fibre of existence consciously or sub-consciously gravitates, should be the main object of her education. For motherhood is not only her destiny which nature has prepared for her through countless ages but is also her redemption. It is the fulfillment of her life. All other ovocations are but vicarious for her ; in motherhood alone

she graduates into life. Race is renewed and immortalised through her, but she also gets a regeneration of her soul with the new birth.

All that pertains to prepare her for fulfilling the noble tasks of motherhood, which is the supreme mission of her life, is an ideal education for her. And this is a good deal and of real value ; the rest is but of secondary importance. Man must study agriculture, engineering, medicine, law, chemistry, mechanics and astronomy which needs strong muscles and abstract reasoning, to explore, to raise food-supply, to preserve social order, to prevent disease and prolong life, to utilise the resources of nature for the comforts of existence ; woman should study literature, poetry, art, æsthetics, horticulture, principles of biology, eugenics, sociology, dietics, personal, domestic and child hygiene, child psychology and pedagogy, which intensifies and sensitizes her emotion and sympathy, which enables her to surround home with suffused fragrance of culture, refinement, health, beauty and joy and synthetising the achievements of the race, as a faithful custodian she can transmit it to the next generation as a torch of knowledge in an unbroken procession of historic continuity.

There is her personal happiness and glory ; a knowledge of supreme worth to her as well as the regeneration of the race. Division of labour always leads to economy and efficiency of products. Why this law should not be applied to female education ? She is intuitive by nature and she has an instinctive repulsion for purely abstract intellectuation as mathematics, physics or logic. Her education should be of that generic and genetic kind which harmonises with her nature, thereby reducing

friction and producing more successful results. Woman has never invented anything. Cradle and oven are male inventions though nursing and cooking have been her occupations from pre-historic times. She has caused him to do that for her and made it possible for him to accomplish it. She has been his civilising agent. Without her he would be still a roaming savage. Agriculture owes its origin to her thrifty habit and fore-sight, thereby laying the foundation of settled home, family, society and civilisation. She has been a kind of catalizer to him, bringing out all the best in him, acting as a centripetal force. Man owes to her all that is and she can do infinitely more for him. The function of education should be to make it possible for her to create the super-man in training and concentrating her nervous energy to things of vital worth to her as well as to the race, instead of dissipating it in frivolous intellectual fashions.

PART II.

I.

Elementary Education

Education should try to harmonise the four principal epochs of social development—savage, mythical and epic, theocratic and periods rational—conforming with the child mind which passes successively through these different stages as a completion of post-natal ancestral re-capitulation. Elementary schools should therefore be situated wherever possible near lakes and forests, so that the primeval aquatic and arboral instincts of the children can be satisfied.

The school house should be erected on a healthy elevated ground with natural drainage and with good outlook of water and trees. Every school must have a library to diffuse knowledge and a course of lectures for the elders, to give a wider out-look of life, to cultivate intellectual taste, moral and religious ideas and to provide practical instructions useful in every-day life, as personal hygiene, prophylaxis against infectious diseases, dietics, new agricultural methods for improving and increasing the products. This has also a direct educational bearing on the children, for they are very imitative and they easily acquire a habit without any effort by imitation. As the elementary teacher can not be expected for a long time to come to be competent to discharge this complicated task efficiently, it is necessary for the larger

community to provide the lectures. In a country like India it is not hard, if an organised attempt is made to make it a success. If ten thousand university students, professors and scholars form an association and if each one devotes only twenty days a year and delivers a series of lectures, in his own line of proficiency, illustrated with streoptican views wherever possible, travelling from place to place like wandering Buddhist monks, who did not stay in one place more than three days, unless incapacitated by sickness, enough lecture materials can be provided in a province. There should be a weekly or a monthly journal, to direct this movement, to rouse civic pride, to secure donations from public-spirited men, to provide slides, charts and illustrations for the use of lecturers and to give new ideas to teachers by describing the different methods of Kindergarten systems in various parts of the world. The lecturers also feel proud to do their work enthusiastically when they know that the country is watching their activities and the efforts of successful ones would be rewarded not only by the result of their works but also by public approval and esteem. This can be easily extended to inter-provincial spheres, so a Bengalee can go to other provinces, a Punjabee, Marhattee, Gujrati, or Madrasi can come to Bengal, whenever he has something to say, on art, literature, sociology, science and religion and can come with the assurance that all will be provided for him, and he can combine his lecture, recreation and vacation tour together, thus having an enjoyable and instructive time for him as well as the cities and the provinces he visits, doing a civic work of high importance, fusing the country in national

consciousness, more than in a political sense. This important function of national extension university was performed in medieval India by *Kumbha melas* and *tirtha jatras* (religious pilgrimage). At that time religion was supposed to contain all knowledge that was worth knowing especially after the destruction of the universities of Takshasilla and Nalanda; and foreign conquests reduced India gradually into intellectual inertia and impotence. But with change of time new methods have to be applied. Hotels are too expensive, uncomfortable and unavailable in many places, and religious prejudices and caste and food rigidities are yet too strong to be ignored. Hospitality is a special trait of the Hindus.* Naturally an anthropologist or sociologist of Bengal would be only too glad to entertain a fellow scholar from another province and his hospitality would be more than repaid by fresh current of intellectual thoughts and enthusiasm. All that is necessary is to canvass every city and to ascertain the names in every locality as to the nature of the man they would prefer to entertain and to publish the list in an annual register so that the host and the guest can easily find each other through correspondence without loss of time and energy.

Politics should be avoided as far as possible, not only to avert any conflict with the authorities, so long India does not get her self-government, but also it is questionable whether it is a wise policy to drag political partisan acrimony into the school house. For those discussions there are market places and private and public halls.

* Here the word Hindu is used in the anthropologically generic sense, including the Mahomedans and Christians.

The school is the civic centre of intellectual liberty and freedom of expression equally open to all, and only abstract questions should be discussed which do not bring personal bitterness. However patriotic ideals should be always placed before the child's mind, as the child has a strong tribal instinct, and loves to hear stories of national heroes. Rousseau says : "National education belongs only to people who are free. It is education which is to give to men the national mould and to direct their opinions and their tastes that they will become patriots by inclination, by passion and by necessity. A child in opening his eyes ought to see his country and nothing but his country. Every true republican along with his mother's milk imbibes love of country, that is of law and liberty. This love constitutes his whole existence. He sees but his country, he lives but for her. So soon as he is alone he is nothing ; so soon there is no more of country, he is no more. While learning to read, I would have a child read what relates to his country ; at the age of ten, I would have him know all its productions ; at twelve all its provinces, all its roads, all its cities ; at fifteen the whole of its history ; and at sixteen all its laws and there would not be in the whole country a notable deed or an illustrious man, his memory and his heart were not full." (Gabriel Compayre : *The History of Pedagogy*, P. 308).

In the elementary school, the child should have no restraint. He should have entire freedom to come and to go whenever he pleases. He can come to the school at the age of five or a few months earlier, if he so desires. But there should be no task for him, before he is nine. If he is born in a good family and in good neighbourhood,

by that time he has already acquired an excellent command of expression in his language, and a large amount of information on various subjects. The child is naturally inquisitive. The teacher by his personal charm of being in communion with the child spirit, should only act as a magnet to draw them to him and answer all his questions in an intelligent manner, yet within the comprehension of the child mind, so as to lay the foundation of future natural history, physics, astronomy etc. The child asks, whence come rain, mist and storm, what is the sun or the moon?—all kinds of questions, which if they can be judiciously answered, become the unshakable foundation-stone of further structural progress of science. The function of the teacher is to rouse the curiosity and the question of impulse of the child to know, and thereby he teaches things which the ordinary parent is not capable of doing. Another advantage of the school is that children are gregarious and here they can meet together under the guidance of a sympathetic clever friend and comrade and can play to their heart's satisfaction.

For the small children the play materials may consist of wooden blocks either in the shape of alphabets and numbers marked on them. Children love to build things and by using these blocks they become easily acquainted with the alphabet and numericals. For elderly children, play, running, jumping, tree-climbing and swimming should form the major part of their training. It not only builds up the muscles of the body, but it also forms the co-ordination of the brain. It gives strength and courage, quick decision and promptness of its execution. Sound health implies sound mind, and an efficient

nervous system is closely inter-related with the bodily integrity.

Attached to every school, there should be a little flower garden, a small piece of land as an agricultural experimental station of some domestic animals and birds. Children are very fond of birds, animals and flowers. Maybe, it is the reminiscence of their early ancestral companionship. Materials should be provided for them for drawing and modelling. They enjoy the work immensely. The teacher should at first make a drawing with coloured pencil or with pigments, clay or wax model of a bird, beast, tree or man alternately and set them as examples for the children to imitate. It teaches them colour discrimination, the co-relation between the subjective and objective phenomena. The youngsters have natural talents for drawing and modelling, but it is spoilt by foolish teachers who demand that they should at first learn how to draw straight lines. No wonder many of the young pupils become disgusted with drawing, for it is a very hard thing and it needs years of training to draw straight lines. But they are delighted to draw a cat, cow, dog, fruit or man or any thing that is subjective. Their sketches or models might in the beginning appear crude and shapeless, for the tiny muscles of the child's fingers are yet weak, but they will be found very expressive, if carefully and sympathetically observed, and anyway it is laying a good foundation for future development in fine arts.

The principal functions of the school-teacher lie in his power of story-telling and music. Choral music develops the muscles of the lungs, deep breathing and a sense of harmony and beauty. Music and dance were the

primeval spontaneous expression of the body and mind, as is seen among the birds who, long before speech was developed, struck and strike still the deepest chords of our soul. Among the savages dances and music are sacred ceremonies. Dances build up muscles and in the rhythmic harmonious movements, there is a joyous exhilaration. Dance is nothing but music in motion. It keeps the muscles invigorated, plastic and supple, giving wonderful power of bodily agility and expressions and when it is combined, as it should be whenever possible, with music it is a noble training and cadence of both body and soul.

Through stories, the teacher can teach a good deal of mythology, history, literature, natural history, moral precepts, personal and social hygiene. Literacy is not intelligence. The object of elementary education is to develop intelligence, at the minimum waste of the nervous energy of the child. He is using his eyes a good deal and his memory. It would be wrong pedagogy to over-tax those organs, by compelling him to learn by rote uninteresting, rather distasteful things as alphabets and numericals, and bring thereby their premature weakness. The child by the new method is much better off in the essentials and brighter possibilities of life. By the time he is nine, he is healthy and vigorous, his nimble muscles are quick, agile and rapid in movements ; his observation is sharp, nothing escaping his attention ; his general intelligence is resourceful and alert ; his will-power is strong and indomitable ; he has learnt a good deal of folk-lore, national history, literature, social polity and ethics ; he can climb a tree with the agility of a monkey, steal birds' nests and make experiments with them ; he can ford a stream, catch fish,

shoot at birds with an arrow and know well the behaviour and habitats of birds and beasts ; he is the leader of little children, he can organise them into an army of offence and defence against neighbourly children, into theatrical shows, fruit-stealing and bird-nestling expeditions ; he punishes the bullies that torment little innocent ones and fights for justice and succours the weak and helpless ; he feels a hero and powerful, and nobility and joyous light-heartedness tingle in every drop of his blood ; nothing is too high for his ambition, nothing is impossible for his achievement ; his proud demeanour, his indefatigable energy, his irresistible impulse to do and achieve, his vivacious face, intelligent eyes, all express an indomitable resourcefulness of body and mind and an all-conquering purpose. And with this spirit he enters into the preparatory school for the serious studies of life. Who will be better, he or the anemic child, the product of the present system of schools, faltering and hesitating in every step, his muscles flabby and weak, eyes lifeless and timid, face pale and dull, the whole gait of the body, irresolute and characterless, trembling with fear ? It needs no prophesy.

II

Preparatory School.

The Preparatory school should take up boys from 9 years of age and train them for 7 years, that is, at 16 they should be made ready for the university. During these

seven years they need various subjects to be taught. There should be certain discipline in the school, but no punishment for its disobedience. Only observance of the school rules and regulation should be made fashionable. But in severe cases of misconduct, the teacher should show his displeasure at such an action but no hostile feeling towards the pupil. He should be against the sin and not against the sinner and this fine art of chastisement he must learn, in order to be efficient. For the child blooms through love and withers through fear. Fear contracts the neural cells, slows up the circulation thus weakening memory and physical vigour. The teacher who has not obtained love and respect from his pupils and has not succeeded in stimulating love of learning through his personal example and conduct as well as by the judicious system of promotion and prizes for the meritorious work, thus creating a healthy competition and enthusiasm for the work among them, has failed in the first requisite of a teacher. If he exacts work and compliance of his orders through fear of punishment, he forfeits all respect due to a teacher, being unworthy of his profession ; for he does both mental and physical harm to his ward. The object of discipline is to avoid punishment. To scold well and wisely is itself, an art which can be only acquired by experience. For some children neglect or ignoring isolation from school mates is enough. It is not the pupils but the teacher who is on trial, and patience and utility should be his watchword as it has been nature's.

The object of education being to develop general intelligence and aquisition of knowledge, there should be as few examinations as possible, as they put a nervous

strain on the pupils and force them to excessive memory exercises. The teacher should simply deliver a lecture explaining fully his lesson and recommend some books to be read on the subject. Next day he asks his pupils one by one to speak on the same to see how far they have grasped it and rectify their mistakes if any. So many students in the class, speaking in turn on the same subject, are apt to make an unforgettable impression on all of them. The fixed curriculum and the keys to explain the text as a parrot, are disastrous in their consequences and outrage the elementary educational principles, especially in an age which, above all presiding ages, is demanding sanity as well as zeal in pedagogical applications.

The subjects to be followed in a preparatory school are necessarily to be many ; for it lays the foundation of general education. And consequently it should embrace a sufficient knowledge of national literature, art, and religion, basic principles of general science, economics, hygiene, sociology and eugenics. Of course it goes without saying that education can not be complete without physical and vocational training. And English being the official governmental language and India having close political, administrative and commercial relation with England, the importance of acquiring sufficient knowledge in English to be able to read, to express oneself and to write it still can not certainly be exaggerated. And moreover, Indian languages lack scientific literature and text books, as well as terminology, and these gaps may not be filled in many years yet to come. It is essential to prepare the students for the graduate course with sufficient knowledge of English so that they can follow

the lectures on scientific subjects in the university and post-graduate studies, which necessarily under these circumstances have to be mainly in English. The subjects being so varied, it is imperative that the students have the choice of taking a group of related course so that they are not compelled to study subjects for which they have no taste or use. For it should not be forgotten that a smattering knowledge of certain things, which for lack of proficiency would be forgotten as soon as school is left, bought at the cost of useful information, is certainly waste of time and educative material. The only thing to be remembered is that the students who can not follow higher course after finishing the school, have obtained sufficient general and useful knowledge in life.

The Language :—In teaching the vernacular, the main object should be to cultivate a literary taste among the students and not to waste time and energy over obsolete grammatical peculiarities. Grammar is the science of language and it has no use in the primary stage, but only in the finishing touch. A boy born and brought up in a good family, moving in polished circles and if he has taste for reading books, when he has read a few hundred books, current literature, magazines and newspapers, wisely selected for him, he has already acquired a certain proficiency and fluency in the use of his language in speech or in writing without any further effort. He will soon make a thorough mastery with the practice of reading and speaking. Of grammar he needs only general principles and not archaic uses. If he still makes some mistakes in spelling, he will learn better with experience and there is the dictionary for that. The

teacher's function would be to create the habit of reading by interesting and judicious selection of books, and to explain passages, which the students find difficult to understand and to give certain biographical anecdotes, psychological motives to enhance the value of reading. Language is the medium of the expression of thoughts. The only thing, the teacher has to see to, is that the student through reading various authors, suitable to his age and advancing years as he grows, has learnt the art of expressing his thoughts in clear and lucid language,

In a sense it must be admitted that the Indian literature is poor or at best one-sided. It is true there are some best epics, dramas, lyrics, mythological narratives, moral aphorisms, erotics and poems and some of the modern products as Modhusudan Dutt's *Meghanath badha kavaya*, Nabin Sen's *Palasir yudha*, *Karukshetra*, Hem Chandra's lyrics, Bankim Chatterjee's novels, Rabindra Nath and D. L. Roy's songs can be favourably compared with products of any other country in those lines, but literature is a more comprehensive term. It is the synthesis of the achievements of the age in the popular language. It is the mirror of the soul of the race. Our literature lacks books on popular science, of travels, descriptive geography, international politics and the translation of the notable books of other peoples. By studying our complete literary products, one still would have very little comprehension of the life of the present age. It lacks books of creative imagination like that of Jule Verne's "Twenty thousand leagues under the sea" "Five weeks in a Balloon", "Round the Moon", "To the centre of the Earth" etc. and they are the favourite readings of

the children of France and have shown wonderful results. In the public libraries of New York, in the children's department, there are more than 8 thousand volumes on the shelf, and many of the books are excellent, nicely printed with large type, well illustrated and beautifully bound on every topic exclusively for children's use from the age of 5 upwards. In Germany, not only the books, but even the mechanical toys are very instructive ; they are the most wonderful creation of the kind. However we should try to make the best out of the material we have at our disposal and put our every effort to its improvement ; for not only in the university, but even in the school, the library has come to be the decisive factor of education and the teacher's function has been reduced to direct and stimulate reading.

History :—India has been often justly or unjustly accused of being a land lacking historical sense, having kept no records of her past. In the sense the Chinese kept the records of all their dynasties in the exact chronological order from the very dawn of its centralised social organisation, certainly India is lacking in that quality. But does the fundamental value of history consist chiefly of the exact dates of the birth, coronation and death of kings, names of their wives and concubines, plots, conspiracies, licentiousness, treachery and intrigues of the court, perfidy of the ministers, poisonings and assassinations for the succession to the throne or for pelf and power and of the petty internecine wars and bloodshed, due to rivalry and jealousy of the princes and the court favourites ; or does it consist of the *Great Epochs of Civilisation* ? India fortunately has obliterated the former events from her memory, while she has

incorporated the latter landmarks of her national life into her body-politic, and any one who has antiquarian and sociological training, can easily decipher the important events in the strata of her social organisation. Details are certainly of interest, but only to the research scholars. There is no reason why the general student should be compelled to burden his memory with these entirely valueless things to him, while he has so much useful knowledge to acquire. The only things for him to learn are the important events and movements that transformed the social organisation, and great epochs of national life as the Indo-Aryan migration into India, Vedic and Upanishadic periods, rise and fall of Buddhism, Mahomedan expeditions and conquest, the advent of the East India Company in the disintegration period of Mahomedan power and the replacement of the by the latter former. It has no vital bearing for an ordinary student to remember the exact day of the birth of Buddha, of the first expedition of Mahommad Gazni, the coronation day of Aurangzeb, of the battle of Palasi or Panipat, the administration of various British Viceroys, for which whenever necessary he can consult a dictionary, but all that is important for him to know is the periods, the century in which the important happenings took place leaving a profound impression on the social and cultural life and how they modified the national growth. But this alone will not suffice—a nation is not an isolated social unit. The inter-action of various races has been a decisive factor in shaping the destiny of all nations. It is therefore necessary to study the general outlines of the history and progress of other races, so that thorough comprehension of the activities and achievements of man can be formed.

Anthropology :—As every nation is more or less composed of different races, often fused together by inter-marriage and social and cultural relationship and no race is of pure blood, the study of anthropology is essential to understand history, by following the racial types and characteristics, their wanderings and migrations and fusion of races due to the influences of war, conquest, trade and religion. Anthropology should be always taught through stereo-optican views, and where it is not procurable by illustrations, collected from various sources, as to clearly indicate the racial type, and the teacher has only to explain them with necessary details.

Geography :—Geography is the description of the earth. It follows, therefore, that it can be best learnt by optic impression. As it is not for the student except in a few rare fortunate cases to travel round the world with a tutor, it is necessary that it must be taught by stereo-optican views or at least by illustrations. For it is absurd and ridiculous to think that a child can form any exact idea of a volcano, mountain, lake or a bay only through definition of a book when he has seen neither, even in a picture. In the study of geography, it is not at all necessary to remember the exact altitude of a mountain, or latitude and longitude and population of a city, but only to have an approximate idea, especially of foreign countries. The fundamental thing is to know how earth is shaped, how a country is inhabited and by what race, what is the climate, how they live and what are the principal occupations of the people? Only of one's own country, there should be lessons in detailed particulars, of basic constructive value.

Mathematics :—Simple addition, subtraction, multiplication and division necessary in every-day life, need to be compulsory to all, but the further advanced course should be optional. It is simply senseless to compel all students to learn geometry and algebra for which he has no practical use and which he will forget as soon as he leaves the school.

Classical language :—The teaching of a classical language is certainly an ornamental educational heritage of the past. Its practical utility is questionable, when one does not acquire sufficient knowledge to be able to ransack its resources for historical and antiquarian purposes, and especially when it is bought at the cost of valuable information. But for India the classical language has a fundamental value in national up-building. Sanskrit is the sacred language of the millions of the Hindus. 85 per cent of the words in the Bengali literature, 75 per cent in Gujrati, 70 per cent in Marhathi, 68 per cent in Hindi are of Sanskrit origin and the vocabulary of Sanskrit derivation can be much enlarged by establishment of philological bureaus and judiciously co-ordinating their activities with the object in view of making India linguistically one in the future, and that is within the range of practical realisation within a hundred or two hundred years. It can be started by teaching the Devanagari characters all over India in addition to the local alphabet and slowly changing Bengali, Gujrati and Dravidian letter into a uniform Sanskrit type. This is not difficult, for phonetically all Hindu alphabets are the same and the difference between the Gujrati and Bengali with the Devanagari is very insignificant. Though Bengali and Gujrati

are more distinct and can be read and written much faster than Devanagari, yet this sacrifice is necessary to national unity. Unhesitatingly as far as India is concerned, Sanskrit is to be preferred to either Latin or Greek, it is not only phonetically superior to them, but it is also more advanced in its structural construction and contains a rich and extensive literature like the Greek. It is true that the scientific and technological nomenclature is generally in Greek or Latin or it is a compound of Greco-Latin derivation, but the dictionaries are very explanatory and the knowledge of the Greek alphabet is sufficient.

From the fore-going remarks it is clear that the national cultivation of Sanskrit is of unquestionable value. It reduces the boundary of provincialism and merges the whole country into one national consciousness, linking the glorious past with the present to build up a great future. It is an inexhaustible common fountain of inspiration for rejuvenation in literature, art, ethics and religion. Nevertheless, it should be optional to the students, for unless it is followed later it is of no practical value. The roots of the tree of knowledge are always bitter; it is only the fruits that are sweet.

However the mode of teaching Sanskrit needs to be radically changed. The old, antiquated fossilised method has to be replaced by modern applications of pedagogy, if fruitful results and efficiency are to be expected. Direct method is the best as in modern languages. Firstly to teach the root of the words, the grammatical niceties and the bewildering mass of rules and regulations, before the students have learnt to speak a few simple sentences of the familiar things in the language, or the teacher has

taught them a few every-day expressions, is undoubtedly waste of time and energy. Grammar is the technique of the construction of language. The student has at first the need of learning the words—the bricks of construction—and then how to apply the cement to connect them, which he can easily learn by imitation and by a few basic rules. Why and wherefore they are used in such and such way and not another is only for the philological expert. A boy learns to swim by imitation of others and what does he care for the specific gravity or the hydrodynamics of water; he eats when he is hungry, but no body tells him to wait until he has learnt the chemical constituents of his food and whether they have been ideally mixed to preserve his bodily equilibrium and how his organic ferments would act on them. Yet in teaching languages we adopt an entirely irrational procedure. The teacher should use simple Sanskrit in his conversation with his pupils and in the class use oral translation and re-translation of every-day expressions, correcting any mistake of the pupils, thus familiarising them with sentence construction. For text book, current Sanskrit fictions are to be recommended, thus leading slowly from simplicity to complexity.

Modern languages :—For India, Hindi should be taught in every province as a medium of inter-provincial communication and it is very facile and easy to learn. A few months, course is sufficient for all practical purposes.

As Europe leads the modern civilisation, it is imperative to learn her languages. There is no question that the English language has come to stay in India and it has almost become the medium of expression of the 'intelli-

gentia' of the country, and those who do not know the language are rightly or wrongly looked down upon as being behind the time. English is undoubtedly a well-spread highly influential language and in it are stored many valuable books on every topic. It is spoken by more than 140 million people and is the official language of two mighty highly industrialised world-powers whose political influence is immense. Yet however useful may be the aquisition of English, it is not sufficient for the needs of modern scholarship of to-day. A man without French and German is a narrow provincial in the intellectual cosmopolitan current of the present time, as one who does not know English is regarded in our country. The English language has not the clarity, brilliance and the cosmopolitanism of the French, thoroughness, profundity and idealism of the German, symmetry, sonorousness and sociability of the Spanish. Language is truly the mirror of the racial soul. The English is spoken by two peoples whose mental out-look is narrow exclusive and self-satisfied and the intellectual out-put is shrunk by the pressure of haughty arrogance of power and possessions. England used to produce before the war nearly 10,000 volumes a year, U. S. A. 11,000—majority of them trash except a few reproduction of English prints or translation of continental works—France 12,000, Germany 22,000. Though France has only about 40 million population it is the cultural language of the Southern Europe and America as well as of Turkey, Syria, Egypt and Algeria ; and French is used in all inter-national conferences. German is of course the cultural language of all North European races. Modern Spanish though most phonetic

and easiest to learn of all European languages has very little importance for India, for it is essentially a commercial language and there is little scientific literature in it, and the Spanish-speaking people use French text-books in their universities. A book printed in any of these four languages has almost the same circulation or at least is accessible to the same number of the people. However the French has the most cosmopolitan readers and German the most serious scholars. It shall not be forgotten that modern civilisation is fundamentally a central European product and owes its vitality to the intellectual earnestness of the French and German genius. The French scientific literature is the best written in the world, in a style that is marvellously flexible, at once lucid clear and logical. But the German style is ponderous and heavy, reflecting the racial type, but the work is thorough and complete being often the product of life-long research and industry. No other race in the history of the world has ever shown such patient indefatigable energy and courage for intellectual labour. Any scholar who wants to be up-to-date in his branch of activity would be very much handi-capped without these languages, as there are very few books translated into English. The English being a conquering and domineering race has a contempt for intellectual speculation and if a few are translated they appear too late, and the periodic literature, the vast reservoir of information of experimental researches, is often untouched.

Japan has made wise selection, following the tradition of the practical common-sense of the Mongolian race, by prescribing English to be taught for commercial purposes,

French for politics and art, German for science. But a scientist needs all these three languages in order to be able to benefit by the result of their works and not to waste time in experimentation over things which are being done by others.

However for the preparatory schools, English is enough and in the University English can happily become a good medium for learning French and German, as English is a connecting link of both the languages having in her vocabulary words of both Latin and Saxon origin.

English should be taught like the Cortina or Berlitz's direct method. Little attention should be paid to correct spelling which is not based on phonetics and it can be only well learnt by experience and practice. A few elemental grammatical rules may be useful, but no special emphasis should be laid on them. The only thing a teacher needs to see is that the pupil learns to pronounce fairly well and can understand when he reads it. The oral system of conversation, translation and re-translation in the class is very useful ; it accustoms the ear to the sound, making thereby a strong impression on the memory. Some Indian stories or fictions translated into English may be useful reading, the subject-matter being already known to the scholar, whenever he does not understand an expression he can easily consult the original. It is entirely ridiculous to use Dequincy, Shakespeare and Milton as text-books as is done in Indian schools and colleges, for even in the land of their origin they are more honoured than read. Moreover current English is entirely different. The student has needs to be acquainted with the English that is spoken and written in periodicals, newspapers, and

scientific books and magazines. He does not study English for its literature—his own literature is rich enough at least as far as mythological or emotional aspect of it is concerned—but to make accessible to him the vast scientific treasures that are locked up in it and which he can not find in his own language. Of course there is an element that studies it simply to improve their economic possibilities, as a clerk, government servant or lawyer, and with that kind of social parasitism we are not here concerned. But for none of these purposes, Milton's *Paradise Lost*, serves any use or makes any equivalent compensation for the time and energy lost in studying it. English therefore must be taught to serve a practical objective and not to fritter away the precious time of the student's life with the old English poets, dramatists or the "Confession of an opium-eater."

Chemistry :—It goes without saying that everything needs to be taught in the Preparatory School through the medium of the vernacular. Only international scientific nomenclature should be preserved to avoid confusion and duplication of the terms. The foundation of chemistry can be easily laid in the beginning of the school-life by decomposition of water or simple food analysis. Chemistry is the basis of all sciences. Life itself is the resultant of chemical ferments. Man made a great stride in progress when he learnt agriculture. In the nomadic life it required many square miles for a family to eke out a living out of hunting and fruit-gathering, while in agriculture a small piece of land was sufficient for its nourishment. If synthetically assimilable protein, carbo-hydrates and fats could be made, the

possibility of which is indicated by the recent researches of Emile Fisher and his disciples, then a vast number of people could thrive, as in a bee-hive, on that piece of land which can now barely maintain a family in comforts. And if these nutriments could be made in a concentrated soluble form, to be proportioned into the needs and the requirements of the individual and could be injected directly into the circulatory system, eliminating entirely the digestive process which consumes so much nervous energy, man's brain would work out miracles. The digestive apparatus is the major causative factor of various ailments due to the intestinal decomposition and fermentation and the absorption of the toxins in the organism, and if this could be eliminated, man's life would be prolonged to hundreds of years and he would be the victim of very few ills to which he is subject to-day. Thus the importance of chemistry can not be over-emphasized; it has a vital relation with the modern industrial and economic life.

Physics :—Energy is the basis of all motion; motion is the transformation of energy. Man can move his muscles, for 'Glycogen' is oxydised in the machine, and power is generated. The steamer moves, for coal is being burnt in the furnace expanding water into steam which can only release itself in the movement of the wheels. The house is lighted from the water-fall, for the momentum of the fall of water is being converted into electric energy and conducted through the wire. The wind-mill draws water from the well, for the motion of the wind is being utilised for the purpose.

When man first learnt to domesticate animals and

used them for his labour, it was a great extension of his energy. But when the steam-engine and the motor were developed, human and animal labour lost much of their previous value, as machines can work much better and at a lesser cost and up-keep than human beings and animals. This has led to the abolition of human slavery and perhaps with the further development and cheapening of motor plough and auto, bulls, buffalos and horses will dwindle into extinction. Mr. Buchanan says:—"Every thing must go down before the *white man* excepting what he desires for his selfish purposes to preserve. This is no longer a speculation ; it is a necessity. In a short time—it may be in the lifetime of the infant born to-day—the wealth of beautiful living things that have lived and developed during countless ages, will be as strange to it as the fossils, that are dug out of the earth, are to us to-day. The world will be dominated, if not exclusively inhabited, by the *white man* and the animals which he has domesticated, their parasites and their vermin." (J. Y. Buchanan : Accounts Rendered, F. 26.)

Man is actually dominating the procreation of animals, except in the lowest of the scale, bacteria and amoeba and they too will be possibly brought under control within a short time. According to the Malthusian doctrine, population increases according to the means of subsistence at their disposal. Whoever controls the food-supply, regulates the population. Savages and inferior races are tolerated, only because the domineering nations are divided among themselves and the mechanical devices are not yet perfected to dispense with the manual labour. Wood and raw materials are needed and the *white man* has not yet

acquired sufficient knowledge to adapt himself easily to a tropical climate and to raise them. So the indigenous are still an economic asset and are suffered to exist only as a necessity.

When man first learnt to stand on his legs without the support of his hands, it was an immense additional strength to him, which surpassed his presimian ancestors by leaps and bounds. He perhaps learnt it when in quest of food, he had to extend himself, holding himself erect on his legs, and catching with one hand the branch of a tree and with another hand picking up fruits and insects for his food. When he descended to the ground to pick up fruits, he was the most defenceless of all animals, as he had neither the strength of many animals and their horns, nor the poison fang of the serpents. But by the liberated hand he has learnt to collect fruits, or raise a piece of stone when on the ground, or throw it, if need be, against his enemy. His hand thus became the most powerful defensive and offensive weapon. From stone-throwing, it gradually developed into wooden and stone hammer, javelin, arrows, rifles, guns and aeroplane-bombs and he has become progressively stronger with the development and use of these weapons. A man with a rifle is nearly 50 times stronger than a man with arrows—that is, one becomes equal to 50 men in a contest, with the possession of superior arms. May be, the possession of a machine-gun gives him ten times more power and an aeroplane ten times more, that is, a man on an aeroplane adequately equipped with bombs, can easily destroy 5000 men who have nothing but bare arms and sticks to fight with. This magnificent 5000 times power comes

from the fact that he has learnt to use and apply the potential power into kinetic expression. When he shall have learnt to use atomic energy (Le Bon), he will be nearly million times stronger. England or Germany, though small in area and population, have more machine-power than perhaps the whole human beings of the earth could perform together. If the working capacity of an average human being be estimated one third of a horse-power unit, then either of those countries have more than 600 million horse-power in operation, which will be equivalent to 1800 millions of human beings, the approximate population of the earth to-day. And this would be thousands of times aggrandised if instead of depending on steam and electricity for power, the centre of the earth could be tapped for perennial energy.

Even in agriculture, the application of physics is apparent. All growth is due to the super-abundance of the cellular life. Cell and the cell-vitality is the expression of the accumulation of energy. It has been demonstrated in experimental agricultural stations that growth is much accelerated by passing alternate electric current, though with the development of technique, it is not mere fancy to believe that it may be possible to have a harvest in a week instead of five months, thus increasing the food-supply of the world more than twenty times. Already the judicious use of the fertiliser and rotation of the crops has doubled the product. The sun-rays, the fountain of energy, have hardly yet been used through any mechanical concentration and application.

Natural science :—Pubescent youth loves nature with all the intensity of his soul. There seems to be a

communion between him and flowers and birds, animals and forest, water and trees. He is hungry after them. Perhaps because that was for long his abode. He has still the roaming spirit of a savage. The teacher should take advantage of this roaving instinct of youth and lead him to fields, forests and streams and teach him from the direct page of nature the gradual process of evolution and the art of classification and systematisation of the fauna and flora. It is a great mental discipline and by it various sciences can be combined into a harmonious whole. Attached to every school there ought to be, wherever possible, an aquarium, a small enclosure keeping all the wild animals of the locality and a museum containing mummified birds, insects and plants. Not only biology can be best taught in the open air, but the animal dissection can be used as foundation for comparative anatomy and lessons of physiology.

Vocational Education :—Industrial education necessarily needs costly apparatus, machinery and laboratory. India can hardly afford it at present except in large centres of population. It is entirely useless and waste of time to teach the function of a dynamo or a motor when the student has never seen one. Agriculture being the principal occupation of more than ninety percent of the population, there should be a model farm attached to every school so that new methods may be tried there and introduced in the locality. A carpenter or a book-binder's shop may be employed with advantage. The object is not to turn out a carpenter or a book-binder but to accustom the eye and the hand to work together and to carry out the design with accuracy. It teaches patience, muscular

and mental co-ordination and especially the dignity of labour. Civil-engineering works may be also very profitable and productive, as to fill up the shallow and swampy places, to clear the grounds of jungles and where the land is not cultivable for agricultural use to plant fruit trees, vegetables, ornamental plants and flowers, to create a net-work of canals, to cut down the trees whose leaves might fall into water and pollute it and to create reservoirs of water-supply for the dry season. These activities are specially needed in Eastern Bengal where for lack of hygienic measures, malaria and cholera are invalidating, incapacitating and decimating the entire population. All that is necessary is to set the fashion. Youth needs physical exercise. Here is a healthy physical culture with a great communal utility. It may be said that play is recreating, while work is fatigable. But work is a play when it is done cheerfully and play is tiresome when it is under compulsion. It all depends upon the mental attitude. It is really a shame that in a thickly populated country like India there is almost every year a flood in the rainy season and in the summer, there is scarcity of water to drink and more than 22000 twenty people are annually killed by wild animals. In Holland they have recovered and are recovering land from the sea and we in a well-settled country can not protect ourselves from wild animals and regulate the course of streams in an alluvial soil, which hardly needs any engineering skill except to dig the shovel in a concerted plan.

Sociology :—The teaching of the principles of sociology should be supplemented by their application in the social order. For this reason as well for the mental

discipline of the scholar, there should be kept a complete register of all kinds of statistics of the community in the school, the number of births (boy or a girl, whether it is the first or the second child, the age of the parents, when was the first child born, the health of the baby, of the parents, previous children, etc) deaths (causes, at what age marriages age of the parties), population of the community, (classifying by age) income, expenditure, saving, sources of income, agricultural products, cattle, trees, fruit trees, all kinds of detailed information at large which are easily accessible to the students and can be methodically grouped together in the class-room. To see there is no mistake in the report, there should be a committee of five students headed by the teacher of sociology, who will check all statistics and submit a condensed account to a central organisation.

For the maintenance of order, discipline and observance of school rules and regulations, the entire administration can be safely left to the students, thus training them in self-government. In every class in the beginning of the school session, a judge, a jury of five, a prosecutor and a secretary can be elected and they are to see that any offender against the code is brought before the class tribunal to answer the charge. He may be allowed to plead for himself or to be represented by some one else in the class according to his choice, and if he is not satisfied with the verdict he will have the right to appeal to a judiciary committee, composed of five members elected from the entire school. All records must be kept and handed over to the statistical department.

During holidays there should be excursion parties led

by teachers, when lessons of natural science, geography, geology, anthropology, history and sociology can be combined delightfully with the '*wanderlust*' of youth. In ancient and medieval times we had pilgrimages which acted like a kind of national university extension, spreading knowledge all over the country.

To promote and stimulate intelligence, there must be regular debating discussions on all subjects in each class separately as well as for the whole school under the presidency of a teacher who, in a summarising analysis, will show the defective as well as the salient points of various speakers and make his own conclusive remarks. At the close of the school session, there should be a general ceremony to which the public should be invited. In this ceremony, the teachers should submit their reports and recommendations for promotion as well as reward the students for their meritorious works. And it is to be followed by music, dances, recitals of poems, short essays and a dramatic performance, all contributed by students; and in case in any of these lines, they have not been able to produce something worthy of presentation before a public audience, the teachers must compose them to show that they have not secured their position through favouritism, but that they have real capability. In proper places should be exhibited the note-worthy pencil sketches, etchings, paintings and clay models done by the students and the teachers. Good health, free from disease and sickness, due to personal hygiene, feats of physical valour and moral courage as well as model conduct should not be omitted from being rewarded. Every thing that contributes to the civic pride and glory must be done. Educa-

tion can not be divorced from communal welfare. The school belongs to the public and the public must feel that it is really doing something good and they must be made to take pride in its activities and achievements.

III.

University Education.

It is needless to say that the function of a University is to make available the knowledge that has been obtained already as the crowning glory of human achievements and to extend deeper and wider that realm of knowledge by further researches. The stock of knowledge is unquestionably vast and great. Man has achieved a good deal, but it is nothing in comparison to the future possibilities which are infinite. The earth with all its treasures will belong to the race that will solve some of its mightiest problems. War is antiquated. If still nations fight for domination over others, for the possession of their goods, money, tributes, trades and privileges, any way warriors have been degraded to mere attendants on machines, as artisans have been reduced to common labourers in a factory. The real battle is being fought in the seclusion of the chemist's laboratory, in the new invention or perfection of a machine in the technological work-shop. The University gathers knowledge from the four corners of the globe, systematises it and contributes to it, if it can, and then distributes it to the populace it serves. If it tests the scholars, grants them degrees and diplomas, it is

simply to create a standard and to encourage learning. But when the University becomes, as in India, solely an examining body, it certainly has lost its objective and has been degraded in its function. And moreover the degrees it grants are ridiculous in the extreme—B.A., M.A., L.M.S. etc. can never be incorporated into our social organism. They are both external in body and soul, without the historic continuity of national consciousness. Pandit for men and Pandita for women would be more appropriate for a graduation degree of general course and Shastri for law ; Shilpi for engineering ; Baidya for medicine ; Acharya for theology ; Adhyapak for pedagogy ; Baigjanik for D. Sc. ; Darsanik for Ph. D.

The subjects to be studied should correspond to the course and the degree. Four years' study seems to be the wide-spread custom in all modern countries. The degree should be granted on the recommendation of the professors only under whom the scholar works. To avoid favouritism, a committee of five may personally test the candidates as to their qualification by direct conversation. Written examination method by stereotyped questions leads to abuse of the exercise of memory at the cost of general intelligence and information, mental degeneration and intellectual stagnancy.

There should be some eclecticism in the choice of subjects for the general course. And the pernicious habit of scholars, to come to the schools and colleges, walking just after meals when rest and quietude are needed for easy digestion—walking a mile or two in the tropical sun, the actinic rays of which are excitant and injurious to the nervous system, must be avoided. For an

institution that neglects the health of its scholars, defeats the very object of education.

General Course : National literature ; a classic language, Sanskrit, Persian or Arabic ; Indian language in addition to the vernacular, preferably Hindi ; English ; General Science ; History ; Descriptive Geography ; Anthropology and Sociology.

Law :—Vernacular ; Hindi ; English ; French ; Descriptive Geography ; History ; Economics ; Sociology ; Psychology ; Comparative Law ; Criminology ; for those who enter into civic profession, Civil engineering, Hygiene and City-planning.

Medicine :—Outlines of Anatomy ; Physiology ; Bacteriology ; Pathology ; Histology ; History of Medicine ; The Hindn System of Medicine ; The Arabic System ; Biology ; Physiological Chemistry ; Anatomy ; Comparative Anatomy ; Dietetics and Therapeutics. The medical profession requires to-day a comprehensive knowledge of various sciences.

Theology :—It may be questioned whether theology is an appropriate subject to be studied in a university. The validity of religion in its cardinal points depends on the survival of consciousness, that is persistence of soul as a unit separate from the somatic body after death. And it is entirely a biological and psychological question and biology and religion in this respect are antagonistic. However religion remains yet a great moral and educative force and it can not be ignored. Millions of people believe in it and their faith is stronger than their lives. India is essentially a religious country. Religion is the backbone of her national life. To use this primeval dynamic

agency for national advancement is but a rational procedure. We naturally resent when foreign missionaries accuse us of being uncivilised and superstitious. We feel Christianity is a worse Judaic superstition unworthy of European civilisation as far as its pivotal faith is concerned, and less consistent, logical and philosophical than either Buddhism, Brahminism or Mahomedanism. It is often ascribed to racial bias and religious prejudices, if not to hypocrisy and sordid motives. The fact is that we have different standards of valuation. They evaluate worth by its economic co-efficiency and we through psychic qualities. To us religion is the vital breath of life, the whole life a preparation for the salvation of the soul ; to them at best it is the attendance at church on Sundays, which has also more or less been taking a social aspect especially among the protestants. We subordinate every thing to religion ; to them it is of secondary importance if not of indifference. And if there is no after-life, then they are wiser ; we have risked everything on a shadowy chimera. If two of our priests, even graduates of our universities, are landed by chance on a solitary island, by zeppelin, ship-wreck or malign conspiracy, they would find themselves helpless and with prayers on their lips they would submit to be devoured by wild animals or die gradually of starvation. But two European priests or any two youths from Central Europe under similar circumstances would make fire by friction of stone or wood ; kill wild animals with stones or traps, roast them for food as well as gather wild fruits ; kill migratory birds and from their stomachs would take the grains to introduce agriculture into the island ; make furnace, melt iron

and copper ores and build wireless apparatus to communicate with the external world ; build ships and engines to cross the sea ; or at least try to make the solitude as comfortable as is in civilisation. Theological seminaries in Christendom give liberal education. In religious matter they may have still an exaggerated value and importance of Christianity, due to tradition, heredity, professional zeal and auto-suggestions, but in other relations and of other religions, they are well-informed at least better than the Mahomedan Mullahas and Brahmin Purohits, who are not only ignorant of the happenings and progress of the external world, but hardly know anything except to repeat crystallised stereotyped prayers and *mantras* and who believe there is some magic in those utterances in a strange language Arabic or Sanskrit, of which many of them do not understand completely the meanings. Theological training therefore is necessary to interpret and emphasize the best points as well to subordinate and slowly to abolish the ceremonies that have no integral bearing on religion.

IV.

National University.

There is a vital need in India of a great National University for post-graduate courses and with complete technological departments, in a central location like Nalanda or Benaras, or if temperate climate is preferred, at Srinagar. Unquestionably the country needs it and it

will be beneficial to the whole nation. Instead of sending hundreds of students every year to foreign universities, ill-equipped in every sense in the majority of cases, it would certainly give a better result if an Indian University could be formed under the direction of national educators who know the country's needs, and who would select for its teaching and experimental staff, the world's best available talents, chosen from different countries for their eminence in scholarship, researches and learning. A well-equipped library and laboratory, academic freedom, handsome salary, congenial quarters and surroundings would probably attract some of the world's distinguished scholars. Here Indian students would get what they want at less expense and more profit. In foreign universities he has usually to learn many things that are entirely useless and of no educative value to him. Thereby he loses a good deal of his valuable time. And moreover in trying to adapt himself to strange surroundings, manners and customs and his natural curiosity to know their mode of living and thinking, plunges him into social frivolities while he needs to concentrate all his attention to intellectual pursuits.

In connection with this University, there should be a department for Civil Service preparation and examinations. It is not only unjust but also unreasonable and preposterous to compel Indian students to study in English Universities,* and to compete with British students through the medium of the English language in subjects that can be easily taught in any of the Indian universities

* The book was written before the new Civil Service regulations.

and which have hardly any pertinent relationship to the fitness of the administrative task, duties and responsibilities of a well-populated Indian district. And to let loose that kind of unfinished, premature youths without adequate training and qualification, without previous administrative experience, even without knowing the cultural history and language of the race, its anthropology and sociology, upon a population of two or three million people, who have a complicated moral and ethical code of an ancient civilisation, not only stagnates progress, and creates a fossilised bureaucracy of incompetency and in-efficiency, but also speaks of lack of foresight of British statesmanship. For a prosperous and contented India means a great asset to the British Power and a valuable customer of British Commerce, while hungry and grumbling, she is a big liability. As the Hindu proverb says: Power is intoxicating and ignorance is dangerous ; and when they are combined it becomes the most vicious cause of evils. Young men before thirty five have hardly any reflective judgment, sound logic and comparative power of observation and they should never be entrusted with power and authority, which is almost autocratic and without control in India, unless gradually trained up for this responsibility. Indian Government supports this lamentable state of affairs on the theory that moral character is the best requisite of an administrator and no amount of education in India can compensate the influences of the British university atmosphere, creating unique governing ability combined with high sense of duty. This moral superiority of moral qualification is indeed very vague and indefensible if not a cloak to hide selfish interests. Bribery, corruption and

favouritism must be eliminated from any service, as they are corrosive solvents of efficiency and competency ; and there are various ways to check them. And honesty is no exclusive prerogative of one race even if it can not be bought at the cost of efficient service and progress.

It is undeniable that foreign travelling has many advantages. But it needs certain preliminary education to understand and to make use of them. Indian youths go to England for Civil Service too early in life and busy themselves in routine studies ; and if they succeed in competition, they return to India and bury themselves in routine works. They are victims of a system over which they have no control, in which they have no initiative nor can put any of their progressive ideas into practice. They are but automatons in a complicated ponderous machinery that crushes every thing that does not move with its wheel. And that machine was set more than 170 years ago and has not been renovated since, nor used any new technic and inventions for better and easier operation and efficiency. Any industrial concern run on that principle would have long ago been bankrupt.

It is imperative that candidates for Indian Civil Service must have a thorough comprehensive intellectual grasp of the problem that lies before them for solution. Here is not a question of racial bias, or monopoly of high-salaried appointments, but of the service that will lift up the country in the true path of progress, health and prosperity. Civil Service in order to fulfil its arduous task ably, must be open to all, and not on proportional basis, so that the best talents and abilities can be had and developed. As it stands to day, its function is simply to

see that the revenue is collected and the signature put in different papers. It hardly deals with any constructive policy—and this should be its main object—as to the increment of the farm products by modern method of agriculture adaptable to the country, irrigation, drainage, rural hygiene, a better system of communication through canalisation and road construction, encouragement and extension of education, reduction of child mortality and preventive measures against infectious diseases and epidemics. India is sorely in need of able magistrates with vision and power—not mere mercenary political puppets and watch-dogs of the Empire, but those who serve the people conscientiously—the people whose interests they are supposed to look after.

The Civil Service course therefore should include, Sanskrit literature, the history of the province in which the candidate wishes to take service, anthropology, sociology, economics, history, cultural history of India, economic geology of India, agriculture, rural hygiene, civic engineering, city planning, business administration, banking system, psychology and ethics.

The successful candidates, however, before being entrusted with the responsibility of office, should be required to enlarge their views by practical observations in different countries of the world as to the agricultural and rural development and the methods employed. For this purpose a sojourn in foreign lands for about eighteen months is necessary and a stay in England alone can not serve this object. England being insular and immeasurably rich due to her world-wide empire and her extensive foreign trade, is far behind Holland and Denmark in co-operative

movement, Germany in intensive scientific agriculture, France in happy blending of utility, beauty, economy and production, America in mechanical appliances, and Japan in patience, frugality and simple harmony. India is paying a high penalty for incompetency of public servants. Instead of country-places being idyls of health, beauty, prosperity and joy, they lack harmonious plan and scenic landscape, irrigation and drainage, sufficient milk supply for the young and the old, nutriments for the grown-up and pure drinking water for all; the habitations are wretched, miserable and unhealthy; villages are pest-holes of malaria, cholera and dysentery; life is an apology, a doleful tragedy of triple evils, *Ignorance, Disease and Poverty*. And this can be so easily transformed into an earthly paradise—for the soil is rich and fertile, the air is balmy and warm, the sun bright and glorious, the people patient, law-abiding, gentle, intelligent and industrious!

To change famine into plenitude, disease into abounding health, race lethargy and regression into race expansion and progress, all depends upon the solid foundation of a National University and a rational system of education. It is true that India can not have at present an educational policy of her own, as it is intimately interwoven with the fiscal question. But if India is not to follow the foot-paths of extinct or dying races, she must have without much delay her fiscal and educational autonomy which are more vital to her than political judiciary or administrative self-government or military control.

Girls' Schools.

Girls can be educated with boys in the elementary schools where separate arrangements can not be provided for them. Sex differentiation does not take place before nine. But the objective and the mental attitudes are different. Boys love adventure: sentiment appeals to girls. Boys prefer to play warriors with arrows and swords, climb trees, catch fish, and cross the stream; while girls enjoy watching them with admiration, and like to play with dolls, nurse flowers and plants. Play, we have shown, is the repetition of the past activities of the race, as a subconscious expression of the phylic soul for life's preparation, and in this we have a clear and distinct hint from the great school of Nature. Man must conquer and achieve, and woman must assimilate and synthetise it and transmit it to the next generation. Gradual differentiation of sexes is the law of evolution and progress. In female education this should be our cardinal principle. This is the path of least resistance and chosen by Nature for racial advancement. We shall not train girls after the model of boys and defeminise them. Rather we shall intensify her sex qualities.

Her play, her text-books, her lessons, her teachers must therefore be different. Co-education harms both. It effeminates boys and vulgarises girls. It reduces the educational efficiency of both. Girls at the same age are more intuitive and intelligent than boys. So boys, unable to compete with girls in the same lessons, become timid, irresolute, lacking will-power and self-esteem. Girls too

regard the boys with contempt for their intellectual sluggishness and are puffed up with an inordinate vanity of exaggerated self-importance, stuffed with a mass of half-digestible information which can hardly be of any real value to them. In the presence of ladies, teachers discourage and forbid all rude expressions of physical valour and natural questionings, calling it rowdyism and impoliteness forgetting the boys have needs to be barbarians and their souls yearn after knowing those things while girls feel queer in the presence of opposite sex and in order not to betray themselves they consume a good deal of nervous energy in self-control. And boys and girls can not be put to the same intellectual discipline and strict moral accountability without serious harm to both. The nervous system of the girls is delicate as her physical organism. During menstruation she needs complete rest. That is her sabbath inflorescence period—a birth on a small scale with all its pains preparing her again for a new life. Boys too instead of regular Sundays, can have holidays after a calendar of the epochal events of the human history so that reflection, meditation and rest can be combined. The birth-days of the worlds, foremost religious teachers, Buddha, Confucius, Krishna, Zorostra, Christ and Mahomed ; philosophers, Kapila, Aristotle, Comte, Spencer and Haeckel ; important Discoveries and Inventions etc.

Fortunately for India, girls have had different ideals, discipline moral regime and training from those of boys. Illiteracy is not inconsistent with education, culture and refinement. Hindu girls have the traditions transmitted to them from elderly women, as to personal hygiene,

eugenics, dietry, aesthetics, religion and philosophy of life. She had the ideals of Sita, Savitri, Damayanti, Radha and Padmini. She has heard religious theatricals expounding philosophy, recitals of the Ramayana and the Mahavarata, encyclopædia of knowledge and information of immense educational value for both men and women. This has happened in the dark and gloomy period of Hindu civilisation, in a state of bondage, impotence, poverty and ignorance. Before that the Hindu women were noted for their learning and were co-partners with their husbands in intellectual work. A few names have survived floating through the debries of the past and they suffice to indicate their intellectual value and earnestness as Gargi, Khona, and Lilavati. Literacy is of great help to educational progress ; it opens an infinite realm of exploration, beyond the personal reach of hearing. In the west where education is compulsory and girls are taught to read and write, majority get disillusioned about men, if they have been in a co-educational school. After leaving school they generally forget all they have learnt and if they read anything at all, it is flimsy romance and sensational newspapers, which does them really more harm than good. So learning to read and write is not of much value unless one learns the habit of enjoying good and instructive books. Even many of the graduates of the Bernard and Radcliffe, the two foremost girls' colleges in America, have anything but a smattering knowledge of things and they hardly learn anything that will be of real worth to them. They study a little of literature, grammar, composition, mathematics, history, phonetics, Latin or French, but in 80 per cent of cases if not more, they can hardly read a French

or Latin book without repeatedly consulting dictionaries and they will forget it all as soon as they leave the college ; and then if they read anything they will read only Jack London, Bernard Shaw or what they call psychological novels. I do not say that this education is of no value to them. It gives them dignity, poise, self-respect, esteem and assurance. They form valuable friendships in the class. It is the fashion, as it is to put on a smart hat. It gives them better chance of marriage or to make a better independent living as school teacher, secretary, stenographer or librarian. The thing of fundamental value from the college is the physical culture training. But even in this the pendulum is swinging in the extreme. Women must take mild exercise, as walking, gardening, swimming and rowing. Violent gymnastics are injurious to her health. She needs her muscles to remain plastic and supple for beauty, charm and expression.

The Orient does not need to be dazzled by the meteoric success of the West. She has no need to topple down her every time-honoured institution that has evolved out of the wisdom and experiences of the ages and pattern every thing after the occidental fashion. The occidental social fabric is yet very unstable. True, the East has yet to learn a good deal from the West and it will take more than two or three generations to reach their level of intellectual attainment. The fact is, in the cold, inhospitable European continent, in the intense struggle for existence, they have developed a tremendous amount of physical and nervous energy to counter-balance the climatic disadvantages. And they have turned the disadvantages into their advantages. Lacking natural heat, they have produced artificial heat

to warm their dwellings and workshops. They have lengthened their short wintry day light by electric light. Lacking tropical products for nourishment, comforts and luxury, they have requisitioned them by military control or economic exploitation. They have shortened the rough trails by railroads, narrowed the oceans by steamships, conquered distance, time and space by telephone, wireless and aeroplanes. These are no inconsequential achievements. It is vain to say that they are but mere material success. They are spiritual in the truest sense, for they are the creations of mind. We have been dreaming with stuffs of imagination for a heaven of happiness ; here with matter they are making the earth a paradise, removing pestilence, reducing discomforts, providing food and raiments to all. A common artisan in European or American capital has more comforts and services at his disposal than Pharaoh enjoyed in his palmiest days.

Yet in this brilliant western civilisation, there is a very weak and vulnerable armour—it is based on individual greed, cupidity and selfishness, without any consideration of ethical principles but opportunism. Men find it more convenient and cheaper to remain bachelors while many so called smart women shirk motherhood, fearing it deprives them of social pleasures and beauty. However, Dame Nature may serve her purpose as far as procreation is concerned by the guise of pleasures in bringing out their coalescence, and if Strindberg learnt to hate woman with each marriage and he finished the game with the fourth wife, and if women begin to be disillusioned with each new husband, still there is enough population to go around inspite of all

precautions. But the children are accidental, not of any concerted wishes and plans and are often unwelcome guests. Man is usually ignorant of eugenics and responsibilities of parenthood ; woman lamentably lacks knowledge about sex-matters, personal hygiene and child nursing. These things are tabooed in schools and societies. A Hindu girl is better prepared and fitted than an accidental college girl. Hence the illusions. The Orient has to learn a good deal from the occident, but she has to use discrimination in selecting what will be best for her. The English Amazons stormed Parliament and the ministers and demanded political franchise. Their American cousins paraded with waving flags and barricaded the White House for the same rights. The German women understood better the fundamental value of things and they said to men : "You say, home is the place for women. We agree. But make the home a healthy and clean place to live in. If home belongs to us, let us be the queen of the home. Let there be the same standard of morality for men as for women, so that thousands of innocent wives are not infected every year for no fault of theirs. If motherhood is sacred, and we believe no other calling is more holy and natural to her, make it a pleasant task for her to perform her supreme and glorious duty to the race. Let motherhood be pensioned, especially families that need help".

But majority of women are to be wives and mothers. Motherhood is the fulfillment of woman's life. She becomes complete, the divine mother. Yet for this supreme function she receives no training. It may be said instinct comes to her help ; but instinct is being

gradually obliterated by the multifarious cross-currents of modern life. A cat can nurse her kittens better than a human mother without lessons. Bergson is of opinion that intuition is lost proportionately to the growth of intelligence. Even in sexual life, ignorance of its laws causes so much misery, wrecks so many promising homes and causes so many tragedies in married lives! It may be said that individuation is opposed to genesis, that as we ascend the scale of evolution, the number of progeny is reduced. Thus a fish lays out a millions of eggs: a pig 7 or 8 in a litter; a cow only one at a time; even among human beings, the poorer improvident families have usually more numerous children than the rich and cultured who hardly procreate themselves. The fact is, many of the numerous fish eggs would perish in the struggle for existence so that a few get chance to survive; and among the poorer classes there is more mortality. Nature tends to do better and more economically—a fewer and better children and less mortality, so that the race improves.

Reproduction is the process of unfoldment. It is nature's law and she is generous in her provisions. If a few are sterile in their embraces, it is because nature punishes those with extinction who have committed capital crimes against her laws. Rightly the ancients associated barrenness with sin. In every male spermic ejaculation, there are more than two and half million spermatozoa and if each spermatazoa is to unite with one ovum, it will need all the available maidens of the world and nature has so bountifully supplied that the ovum could not escape being impregnated by at least one of them. Of course the question of sterility is a complicated

one. It may be due to venereal diseases, excessive venery over-nutritions or mal-formations of the reproductive organs. Sexual impulse may be reduced or sublimated by excessive intellectual labour, for the nervous energy has not the surplus for both functions, but nature does not demand sterility as the price. Rather all other organs, functions and forms as beauty and intelligence have been developed to facilitate the reproduction of the race under the most favourable conditions and hedonic intoxication. Even woman's sexual impulse fluctuates to-day with the tidal waves of the ocean, where life first sprang as a gelatinous protoplasmic mass, that is, it reaches its climax with the newmoon and the fullmoon of her menstrual lunar month. Her whole existence consciously or unconsciously is centered round her sex and round which rotates all her feelings, sentiments, and intellect.

Her educational course therefore should consist of her home interest, her sexual life, her children. Of course after graduation if she wants to follow any university study, she can do it, just as any regular male student. The school should be in a quiet place, surrounded by lakes and parks so that she can take pleasant walks and enjoy recreations such as rowing or swimming. The teachers should be females with whom girls feel less reserve and can ask all questions they want. The subjects should include :—Provincial literature : Poetry ; Hindi ; Religion, Music, vocal and instrumental ; Plastic and graphic Arts ; Dancing ; Elementary Arithmetic ; Cooking ; Domestic Science ; Principles of Biology ; Eugenics ; Psychology ; Nursing ; Hygiene ; Aesthetics ; Child-

pedagogy ; English , Outlines of History ; Geography (But the names should not be disfigured as Muttra, Beneras for Mathura, Baranashi) ; Mythology ; Ethics.

In this connection it would not be amiss here to quote the third chapter of the first part of *Kama Sutra* of Sage Vatsyayana as to the arts and sciences girls ought to study. More than perhaps twenty centuries have passed by, but the principles of female education remain just the same and time has not changed human nature, and the ancient sage had psychological insight and wisdom.

The Arts and Sciences for Study.

“Man should study the *Kama Sutra* and the related arts and sciences, in combination with his studies of arts and sciences on *Dharma* (Religion) and *Artha* (Economics). Young girls too should study *Kama Sutra* as well and the auxiliary arts and sciences before their marriage, and after their marriage they can continue the study with the consent of their husbands.”

“Here the wise men intervene, saying that as women are forbidden to study any science, they should not study *Kama Sutra* (Aphorism on Love).”

“But Vatsyana is of opinion that this objection does not hold ; women already know the practice of *Kama Sutra*, the practice being derived from *Kama Shastra* (Science of Love) or the knowledge of love itself. Besides, it is not only in this particular case, but also in many others, that the practice of science is known to all, while only a few know the rules and laws on which the science is based. Thus the *Yajnikas* or sacrificers, though ignorant of grammar, use the appropriate words in addressing different Divinities and do not know how these

words are written. Thus such and such persons fulfill their obligations on such and such propitious days, fixed by the astrologer, without being initiated into the astrological science. Thus the conductors of horses and elephants train these animals solely through practice without knowing the science of training. In the same way the people of the most distant provinces obey the laws of the kingdom by practice, only because there is a king and without any other reason. And we know by experience that certain women, as the daughters of princes and their ministers and public women are really versed in the science of love (*Kama Shastra*)."

She should study the following arts in concert with the *Kama Sutra* :—

1. Singing. 2. Instrumental music. 3. Dancing.
4. Association of dance, songs and instrumental music.
5. Writing and designing. 6. Tatooing. 7. Dressing and decoration of an idol with rice and flowers. 8. The disposition and arrangement of bed, or bed of flowers, or flowers on the ground. 9. The dyeing of the teeth, garments, hair, nails and the body; that is their tint, colour and painting.
10. Putting the coloured glasses on a plank. 11. The art of making bed, spreading of the carpets and cushion for reposing.
12. The play of musical glasses filled with water. 13. The storage, accumulation of water in aqueducts, cisterns, and reservoirs. 14. Painting, arrangement and decoration.
15. Making of rosaries, necklaces, garlands and crowns.
16. Making of turbans and plumage, chains and knots of flowers. 17. Scenic representations. Theatrical exercises.
18. Making of ornaments for the ears. 19. Preparation of perfumes and sweet-smells. 20. Smart arrangement of ornaments and decorations, and harmony in the garments.
21. Magic or sorcery (sudden appearance or disappearance of cards, coins, jewels etc.) 22. Agility or adroitness of the hand. 23. Culinary art. 24. Preparation of lemonades, sherbets, acidulated drinks and spirituous extracts mixed with agreeable perfume and colouring. 25. Making of dress and

garments. 26. Making of parrots, flowers, chains, tassels, bouquet, balls, knots, etc. in wool or in thread. 27. Solution of puzzles, logography (an art of writing in which a letter represents a word), covered words, play of words and enigmatic questions. 28. A play, consisting of repetition of verses: when one person (female) has finished, the other should commence at once, repeating another verse, of which the first letter should be the same as the last letter of the preceding recitress; whoever fails to repeat is considered as having lost and is obliged to pay a forfeiture or leave the game. 29. The art of mimicry or imitation. 30. Reading comprising song and intonation. 31. The study of pronouncing difficult phrases. This is an exercise which serves as an amusement chiefly to children: when a difficult phrase is given to be repeated rapidly the words are often transposed or badly pronounced. 32. Exercise of sword, simple clubs, defensive clubs, bows and arrows. 33. Art of drawing inferences and reasoning. 34. Carpentry, or the art of joining parts together. 35. Architecture or the art of building. 36. Knowledge of gold and silver coins, precious jewels and stones. 37. Chemistry and minerology. 38. Buying of precious jewels, stones and pearls. 39. Knowledge of face (physiognomy) and career (insignia). 40. Gardening; art of treating the diseases of trees and plants; of training them and determining their age. 41. The conduct of fight of cocks, quails and rams. 42. The art of teaching parrots and starlings to speak. 43. The art of using perfumed ointments over the body, and dressing the hair with pommades and perfumes. 44. Knowledge of writing in cipher and writing of words under different forms. 45. The art of speaking, changing the forms of words. This is done in diverse ways. Some change the beginning and the end of words; others intermingle parasitic letters between each syllable of a word, etc. 46. Knowledge of provincial languages and dialects. 47. The art of decorating chariots with flowers. 48. The art of designing mystic diagrams, or preparing charms and enchantments and to tie the bracelets. 49. Exercise of the mind so that one can complete a stanza or verse of which only part is known; or to supply one, two or three lines while other lines have been taken at hazard from different verses in a manner to make the whole complete in the senses; or arranging the words of a verse, which has been irregularly written, separating the vowels from the consonants or omitting entirely; or to put in verse or

prose the phrases represented by signs or symbols. There is a number of exercises of the kind. 50. Composition of poems. 51. Knowledge of dictionaries and vocabularies. 52. The art of changing or disguising the appearance of persons. 53. The art of changing the look of things, as to make cotton goods appear like that of silk and common and coarse objects as fine and rare. 54. Different kinds of play. 55. The art of acquiring the property of others by means of mantras or or enchantments. 56. Dexterity in juvenile exercises. 57. Knowledge of social customs and the art of presenting to others respects and compliments. 58. Knowledge of war, arms and armies. 59. Gymnastic art. 60. The art of divining the character of a person by seeing the traits on the face. 61. The art of scanning and constructing verses. 62. Arithmetical recreations. 63. Making of artificial flowers. 64. Making of figures and images in clay.

VI.

Foreign Universities.

For post-graduate course and for enlarging the mental horizon, foreign universities and travelling are essential. Japan sends thousands of students every year to European and American universities. The United States of America sends hundreds of students to Europe to finish their education. Even travelling itself has educative value, especially in centres of great activities and industries, as London, Paris, Berlin, Vienna and New York, which no amount of book-reading can give. In ancient and medieval India, pilgrimage *Tirtha-paridarsan* was required of every pious citizen. We find in Damodaragupta's *Samaya-matrika* (eighth century) in the fifth chapter that no education was complete at that time without visiting the chief

centres of learning, and Sundarasena, son of Purandara, a wealthy esteemed and virtuous citizen of Patliputra, left his home with his friend Gunapalida, to gather experience and to finish his education in an alien country. At that time *Aryabartta* was regarded as the cultural universe. To-day things have changed, and it has become more imperative to learn foreign science and technique and to use their inventions and discoveries ; and they can be best learnt in the countries of their origin and development.

Of course many seek in education an opportunity for their economic betterment and naturally they would go to universities, where their money is calculated to bring the best return. The majority of Indian students go to England to study Law, while they can study it much better at home-schools at lesser expense and more profit. The people have still the deluded hypnotism to believe that they are more capable for their sojourn in England and are willing to pay for it a higher fee and remuneration. And the demand creates the supply.

For economic and political reasons, the British universities will naturally draw a large number of students. A diploma from Oxford or Cambridge not only carries with it academic distinction, but also has an economic value in India. So other universities in a more or less degree. Yet it is desirable that the Indian students who intend to pursue their studies in Great Britain should make a wise selection of the College. The British universities are meant for the Britishers and not for the Indians, and their needs are different from ours. In Oxford and Cambridge they want to train up men of aristocracy and upper-middle class, who will be statesmen, ambassadors,

administrators and governors of distant dominions, colonies and protectorates of her far-flung Empire, and those qualities which are necessary for success are emphasized there—physical valour, sportmanship, firmness of will yet amiability in manners, resolute character yet obliging, proud and exclusive yet not, haughty versatile yet not a profound and narrow specialist, an eloquent and impressive orator with thorough fineness of the language yet non-committal, witty yet not vulgar, modern and up-to-date yet conservative and sceptical of any new idea and innovation—in short, whatever makes a perfect affable gentleman with purposive action. They are in a sense rich men's clubs, Cambridge being more democratic in her student organisation. Of course one can learn a good deal, if he so desires, in the serene, quiet and refined atmosphere of these ancient aristocratic seats of learning and culture, there is all the paraphernalia for humanistic culture, the richest library in the world open to him. But that is of secondary importance; gentleman-making is the first task. Here perhaps the sons of our princes and potentates will find a congenial soil and get a liberal education and will come in direct contact with men who will in their time direct the destiny of Great Britain.

Manchester and Birmingham universities are clubs of learning. Unlike the continental people, the Britisher does not take education seriously for the sons of ambitious poor middle class, and the technical training and engineering are the special valuable instructions that are given there.

London university holds the middle ground, both as to the class of students and the type of instructions that are given here. The metropolitan Institute combines the

qualities of Oxford and Birmingham, for being in the industrial and the political centre of the Empire, it has to be practical and humanistic at the same time. It enjoys also the privilege of the British Museum Library, one of the richest collections in the world.

For tropical medicine, Edinburgh medical school is probably unsurpassed by any other in its scope and magnitude of researches and investigations, but Berlin yet remains the best for general principles of medicine, and physiological chemistry, so Paris for pathology and Vienna for surgery.

Many students also come to the United States of America on the false assumption that here scholars may be self-supporting. There can be no greater mistake. No gold bricks lie in the streets of New York, Chicago or San Francisco, waiting to be picked up by the newcomer. The struggle of existence in the New World is just as intense as in the Old World. It is still a pioneering country of adventurous immigrants of diverse ethnic groups, yet unassimilated in the crucible of national consciousness, physiognomy and identity, suspicious and jealous of each other, opportunistic in methods, greedy in pursuits, and inconsiderate in its human relationship and with all the crude traits of the seekers of get-rich-quick of passions, prejudices and hatred, especially against the orientals. The way an oriental is turned away from hotels, furnished-room houses, restaurants, barber shops and bathing places is dehumanising. It can not but rob one of self-respect. He has simply to apologize that he has not been treated worse. Again it is not so easy to get jobs. Americans do not employ men as

clerks, but only girls. The only positions the Hindus can get are as dish-washers or waiters. There is indeed dignity of labour ; but the work is nervous, feverish and consumptive and one has very little energy left for study. One can get a degree if he persists thus for four years, but he can not learn much. The value of university education does not consist so much in class-lectures, and they are generally soft in U. S. A., as in laboratory practices and the use of libraries. Rightly the Americans do not value much their university titles and they hardly use them after their names except occasionally in the academic calendars. And there are so many kinds of universities that the graduates of many of them would not be able to stand any test of a high school standard of Central Europe. The American graduates themselves are sent usually to Germany and England to finish their post-graduate course. And the value of education often consists in the environmental stimuli and influences. In the Columbia university of New York which holds an unique place among educational institutions, being situated in the most opulent, commercial and industrial largest city of the world, more than 65 per cent of the students are Jews. And the Jews go there to get easy degrees so that they can exploit others. They not only lie for simple things but they even steal overcoats, books or a few cents whenever they find it convenient. There is no morality or ideal. Perpetual tension is in the atmosphere. Under the circumstances no true education is possible. And the gibberish they speak in the class with the nasal sound, one soon forgets his English if he learnt it before. Even in the street one does not hear

much English. The porter is a Negro who has a slimy, slippery gelatinous tongue without any distinctness of pronunciation in his utterances, the grocery and the delicatessen man is a German with his guttural sound, Italian is the fruit-man with his intonations, the shoe-polisher is the Greek with his half oriental accent, in the shoe, clothing and the stationery stores, is the ubiquitous Jew with his Viddish volubility and one can thank his lot if after staying a year or two, one can use his English with as much facility as before. The true American one does not often see. Generally he has contempt for all foreigners and regards them as inferior beings, if not akin to criminals, and many of the immigrants are really from the slums of Europe if not from the penitentiaries. Of course every body despises the Negro. Thirty centuries of civilisation separate them from each other. He was but a slave two generations ago. Recently liberated, he has not yet found his place. He is a wrong man in the wrong place, though his service is needed in the development of the South. Being but in the child stage of humanity, and not altogether vicious in instinct, drink, disease and distrust have made him repulsive, if not dangerous ; he is vain and arrogant and volatile in temperament. Though forbidden by law in many states and as a custom every where, the Negro blood is being slowly diluted with the worst Caucasian blood. The result is a Mulatto, inheriting the bad qualities of both parents, often born in vice, with all shades of colour, nasal angles and cranial and facial features. The American people have an instinctive, almost sub-conscious idea of inferiority, when they see an individual with a dark complexion, due unquestionably

to the association of Negroes with slaves. And the foreigners learn it soon as an adaptation. Any one who associates with a coloured man becomes automatically socially ostracised, if not in addition the recipient of injuries and insults. The social demarcation is very strict. In the South there are even separate cars for the coloured people, and the coloured man could not enter into the white man's car. And it needs a good power of observation to discriminate between many a coloured man, a South American or a Hindu, and the average person has neither the inclination nor intelligence to waste his time over it.

A Hindu or a South American has to remove the first impression before he can get a room in a decent quarter or form cordiality with an American. The South American therefore goes to the French or Swiss Universities. The Hindus would do well to imitate them. The idea of self-supporting is fictitious if not misleading. Very few Hindu students could earn his living and at the same time finish his course in the regular time. On the other hand quite a few bright students had that vain delusion and became wrecked physically and mentally. It would have been much better for them to borrow money, if necessary, and to go to some cheaper German or French universities.

Notwithstanding quite a few students would go to U.S.A. for study, thinking that as they know English, it would be easier for them to study in a free atmosphere. Each one will have to learn his mistakes by experience. It is not hard to learn French and German in a few months, and the student life in German Universities is not only impregnated with idealistic scholasticism; but also

with the greatest freedom. However those who will go to America, would do well to select Teachers' college, Columbia University for pedagogy ; it is possibly the best institute of the kind and there is hardly any Jew there. The College of Physicians and of Surgeons has also a very good reputation in the country. Princeton does not take any Jews, but as it is for humanistic studies it is hardly of any use to the Hindus. There is every reason to believe that Boston is the best suited place for the Hindus. Harvard is a distinguished university, the subjects are eclectic, the library is excellent and the Jews are not encouraged there. The Polytechnic of Boston is one of the finest institutes of the kind. For electrical engineering, Schenectady is the best. For mechanical engineering, Michigan university at Ann Arbor, and for agriculture cornell university, at Utica, N. Y. can be well recommended *

Though Paris is regarded by many as a frivolous and gay capital, yet it is a great intellectual centre and is thought by many as the brain of Europe. Its Ecole Polytechnique, Ecole Centrale des Arts Manufactures, Ecole de Medicine, Ecole des Beaux Arts are world-famous. But those who do not like the distraction of the great metropolis, can join the Ecole des Arts et Metiers at Chalons, Cangers and Aix—quiet and friendly provincial towns where they are entirely free. The French people are well known for their sociability, intellectual keenness and versatility.

Though Germany has received a great and decisive

* The immigration laws in the U.S.A. have been recently made very rigorous, especially against the orientals, and no Hindu should start for the country without a *bona fide* passport as a student or an author properly vised by the American Consulate.

military disaster, her intellectual life does not seem to have suffered much. On the contrary there is a great revival of learning, due to the release of thousands of youngmen from military duties. Three new universities have been opened and the old ones are overflowing with the pressure of students and intellectual vivacity. Germany defeated in war is determined to take revenge in the intellectual plane. The number of students have increased by nearly fifty thousands since last year. In the present year there are 85,000 students in twenty three universities, and 10,800 in 11 (eleven) technical institutes. She is forgetting her miseries and troubles in mental activities and products of imagination. The number of students are as follows in the universities :—Berlin—10,278, Munchen (Munich)—6879, Leipzig—5583, Bonn—5347, Breslau—4936, Gottingen—4313, Frankfort—4213, Munster—4062, Freiburg—3984, Halle—3490, Heidelberg—3488, Marburg—3335, Wurzburg—3214, Tübingen—3186, Köln—3023, Hamburg—2897, Jena—2843, Giessen—2143, Greifswald—1940, Rostock—1555, Erlangen—1440. Technical institutes contain the number of students as follows :—Charlottenburg—3209, Munchen—2923, Hannover—2591, ; Dresden—2264, Darnstadt—2206, Karlsruhe—1491, Aachen—1088, Braunschweig—872, Breslau—837, Danzig—779. And Germany's technical schools are the best in the world. Of this number 7800 are female students in the universities and 225 in the technical lines. Living is very cheap in Germany, taking into consideration her low exchange rate. And Germany has been well-noted for a long time for profound scholarship, patient and industrious research

and intellectual integrity. A large number of students should go and take advantage of these splendid Central European Institutions. The German language is to a certain extent like Sanskrit in the formation of compound words. It is a language that can be easily acquired ; it is very phonetic and its grammar is very regular. And the German people have a very high esteem and regard for scholars and they as well as the French have no racial prejudice, as among the Anglo-Saxons.

Indian students must go abroad for study and for observation. The days of isolation are over. In the complex current of the international life, either we shall merge out as victors or be sunk beneath it as a historic relic. There is no other alternative. We have shown that they are much handicapped in both England and America. Japan is still in the embryonic process of technical development. She has made great progress. She has produced a good many scholars and indefatigable workers. Nevertheless she has yet to learn a good deal, before she can create an university worthy of being recognised as a great seat of learning. Hence our students should, in general, seek their education in an important university in Central Europe, where there is no passion or prejudice and where the acquisition of knowledge is the main object. Foreign education should be also supplemented by a world-tour ; it liberalises the mental vista and affords opportunities for a comparative study and comprehension of the cross-currents of the world-forces and world-ideas that are powerful factors in shaping the destiny of mankind.

THE END.

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